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1891/92

CATALOGUE

OF

THE PENNSYLVANIA STATE COLLEGE,

1891-92.

STATE COLLEGE, PENNA.
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HARVARD COLLEGE
MAY 19 1893

The College

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H. J. WATERS, B. S.,
Professor of Agriculture.

*Deceased, December 24, 1891.

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H. J. WATERS, B. S., ... *Agriculturist.*
GEO. C. BUTZ, M. S., ... *Horticulturist.*
WM. C. PATTERSON, ... *Superintendent of Farm.*

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JOHN W. FIELDS, B. S., ... }
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NELSON M. LLOYD,
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FRANK J. POND,
Cadet Lieutenant and Quartermaster.

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FRANK ORBIN,
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C. M. H. ATHERTON.			C. H. HILL.
First Sergeant.	*First Sergeant.*	*First Sergeant.*	*First Sergeant,*
F. DALE.	H. W. MATTERN.	C. M. CAUGHEY.	R. B. MATTERN.
Sergeants,	*Sergeants.*	*Sergeants,*	*Sergeants.*
C. J. GIRVIN.	C. R. FAY,	C. EACHUS,	W. P. ROTHROCK,
H. E. DUNKLE.	G. H. HAAS.	F. F. WELD.	D. W. GROSS.
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W. BANKS.	J. E. QUIGLEY,	W. DALE.	J. T. CHAMBERS, Jr.

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Color Sergeant. C. J. GIRVIN.

COLOR CORPORALS.

Corporals GUYER, DICKINSON and DAMON.

DESCRIPTION OF THE INSTITUTION.

Within the last five years the College has greatly enlarged its facilities for instruction by the erection of new buildings, the reconstruction of old ones and the purchase of a large amount of equipment for several of the leading departments.

The Botanical Department,
The Chemical Department,
The Department of Physics and Electrical Engineering,
The Ladies' Department,
The Military Department,
The Agricultural Experiment Station,

Have each been provided with commodious and attractive buildings, designed and built with special reference to their adaptation to the needs of these several branches of work. The drill hall of the military department has also been fitted up for use as a gymnasium, with the Sargent system of movable apparatus. A building for the accommodation of Civil, Mechanical and Mining Engineering is now in process of erection, and is expected to be ready for occupancy at the opening of the Fall Session, in September, 1892.

The college is thus prepared to carry on its several branches of work more efficiently and successfully than ever before, and every effort is made to provide this large increase of additional facilities without any considerable increase in the expenses of students.

The College was organized in 1859 as the "Farmers' High School," and its object then was to give an exclusively agricultural education. Its organization, however, was upon a collegiate basis from the beginning, and its name was, in 1862, changed to "The Agricultural College of Pennsylvania." Subsequently, the Legislature of the State having appropriated to this institution the income from the proceeds of the National land grant, and the scope of its work having thus been necessarily enlarged, its name was, in 1874, again changed, and it has since been known as "The Pennsylvania State College."

The scope of the institution, as now organized, cannot be better stated than in the comprehensive words of the act of Congress itself, defining the duty of this and similar colleges:

The leading object shall be, without excluding other Scientific and Classical Studies, and including Military Tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts, in such manner as the Legislature of the State may prescribe, *in order to promote the liberal and practical education* of the industrial classes *in the several pursuits and professions of life.*

This act of Congress was, in 1863, "accepted by the State of Pennsylvania, *with all its provisions and conditions*, and the faith of the State * * * pledged to carry the same into effect" [*Laws of 1863, p. 214*].

Based upon this broadened foundation, the special work of the State College is the training of youth in those branches of learning which lie at the foundation of modern industrial pursuits. In accordance with the purposes of its founders and the terms of its original charter, it aims to give special and prominent attention to Agriculture, both theoretical and experimental; but it also provides "a liberal and practical education" in the leading branches of mathematical, natural and physical science, in order to prepare youth for "the several pursuits and professions in life," as the laws of Congress and of this State distinctly require. In other words, while the College is no longer exclusively agricultural, it is doing more in the direction of progressive and Scientific Agriculture than when that was its principal object; and, at the same time, it has increased its subjects and courses of study, and its teaching and illustrative equipment, to such an extent that now "without excluding classical studies," its leading object is to teach the various sciences in such a manner as to show their applications in the more important industries, and thus to combine theory with practice.

The range of its work in this direction is shown, as far as the limits of space allow, in the following descriptive statements and schedules. It is confidently believed that few institutions in the country furnish opportunity for obtaining an advanced Scientific education, of equal extent and thoroughness, at so moderate a cost, and with so many incidental advantages.

ENDOWMENT.—The principal income of the College is derived from the proceeds of the sale of the public lands donated to the State by the General Government for College purposes. The State holds these proceeds in trust, for which it has given its bond for $500,000, on which it pays interest to the College at the rate of six per cent. per annum. An additional sum of $15,000 a year, to be increased $1,000 annually until it amounts to $25,000 a year, is appropriated to the College under the provisions of the act of Congress, approved August 30, 1890.

TRUSTEES.—The control of the institution is vested in a Board of Trustees, consisting of twenty-three members. The *ex-officio* members are eight in number, and include official representation of the interests of the Commonwealth, of agriculture, of the mechanic arts, and of general education. Of the other fifteen members one-third are elected annually at the College on the Wednesday before the Friday next preceding the Fourth of July—one by the Alumni of the College, and the other four "by a body of electors composed of the Executive Committee of the Pennsylvania State Agricultural Society, the Managers of the Franklin Institute of Pennsylvania, three representatives duly chosen by each county agricultural society in this Commonwealth, which shall have been organized at least three months preceding the time of election, and three representatives duly chosen by each association, not exceeding one, in each county of the Commonwealth, which shall have for its principal object the promotion and encouragement of the mining and manufacturing interests of the Common-

wealth, and the mechanic and useful arts, and which shall, in like manner, have been organized at least three months preceding the time of election."

LOCATION.—The institution is situated in the village of State College, nearly twelve miles southwest of Bellefonte, and about equi-distant from the extreme parts of the State. Its position, in the midst of a broad, rolling valley, with Muncy Mountain on the north, Tussey Mountain on the south, and Nittany on the east, secures a varied and beautiful landscape and a healthful climate.

A special act forbids the sale of intoxicating drinks within two miles of the College, and all its surroundings are exceptionally free from demoralizing influences and from temptation to extravagance.

CAMPUS AND FARM.—The College grounds contain 400 acres, of which 100 acres are under the direction of the Experiment Station and are used in carrying on its various operations. The tract on which the buildings stand contains nearly three hundred acres. Of this, about fifty acres in the immediate vicinity of the buildings constitute the campus and furnish recreation grounds, sites for residences, laboratories and other buildings. The campus, tastefully laid out and adorned with trees, shrubbery, flower-gardens, walks and drives is one of unusual beauty. The remainder is conducted with a view to furnishing an example of a model farm profitably managed. The professors in charge of instruction in Agriculture and Horticulture make use of all parts of the College grounds for the purpose of practical illustration in their respective departments.

BUILDINGS.—The main College building is a plain and substantial structure of magnesian limestone, standing on a pleasant elevation, and is two hundred and forty feet in length, eighty feet in average breadth, and five stories in height, exclusive of attic and basement. It contains chapel, library, museums, society halls, class rooms and a large number of dormitories. The building is heated throughout with steam, is lighted by electricity and is furnished on every story with pure water from an artesian well. A large part of the building has recently been thoroughly overhauled and rearranged, adding greatly to the facilities for work and for public gatherings. The sewerage system is well devised and frequently inspected, and the unusual exemption of our students from sickness testifies to the excellent sanitary condition of the building. Commodious and attractive buildings lately erected for the various departments, have been already mentioned on page 6.

FACILITIES FOR INSTRUCTION.

In Geology, the College possesses, in addition to many fine specimens of European rock, the collection made by Professor Rogers for the First Geological Survey of the State and is receiving from the State Geologist a duplicate collection of the Second Survey, now in progress. The collections are grouped under four classes: 1. A working collection, consisting of the substances usually forming rock material and of representative specimens of the various kinds of rocks. 2. An economic collection, consisting of coals, ores, clays, etc. 3. A stratigraphical collection, consisting of specimens

illustrative of the various geological periods of the earth's history. 4. A palæontological collection, showing the life of the different periods.

The Botanical Museum contains an herbarium of more than three thousand species, a collection of the woods of Central Pennsylvania, a collection of the woods of the United States (numbering over 200 specimens), specimens of cones, seeds, etc., together with a large number of illustrative charts.

The Zoological Museum contains collections of marine invertebrates and of fishes, presented by the United States National Museum, articulated skeletons, mounted birds, injurious and beneficial insects, etc. It is intended that the museum shall contain specimens of the animals found within the limits of the State, and of such others as may be useful for purposes of instruction.

In Mechanics, a collection of models from the Patent Office, *in Crystallography*, specimens of crystals and models, and *in Metallurgy*, samples of ores and a very fine collection of minerals are available for instruction. Well equipped shops furnish a thorough practical training in wood and iron work for students in this department.

The Botanical, Chemical, Physical and Electrical Laboratories have all the appliances necessary for thorough work in the line of these several departments, and important additions are made every year. The College has a complete set of standard weights and measures, including length, weight, and capacity—both dry and liquid—received from the United States Government.

For Instruction in Agriculture, there are the College and Experiment Station farms of 400 acres, with nearly twenty acres of orchard, a vineyard of about 500 vines, experimental grounds of more than thirty acres, greenhouses, creamery, barns, implements, etc.; the laboratories of all the different departments, and those for agricultural work, with their special appliances for the analysis of grain, grasses and fertilizers, and for extended research. The Experiment Station established under the joint auspices of this State and the United States furnishes every facility for work in this direction.

The Engineering Departments are supplied with valuable machines, instruments, drawings, etc., and an increasing amount of attention is given to these branches of instruction.

The Mechanical work-shops occupy a substantial two-story building well equipped with the best modern tools and machinery, for both wood and iron work. This branch of instruction has so far outgrown its quarters that it has been necessary to fit up temporary rooms for a portion of the machinery in the basement of the main building; but it will be generously provided for in the new engineering building to be opened next September.

The College Library, containing about eight thousand volumes, mostly scientific and technical, and the current issues of leading scientific, agricultural, horticultural and literary periodicals, is open for daily use. The literary societies also have libraries for the use of their members, and society reading rooms, which include in their lists the prominent daily papers and literary periodicals.

PRACTICAL TRAINING (*Practicums*).—The College has, from the first, sought to combine practical with theoretical instruction, and thus to fix in the student's mind a knowledge of both methods and principles. With this end in view, a portion of the student's time has been set apart for such training, and the number of subjects in which instruction is given and the supply of apparatus for it has been increased until it covers an extensive range of topics, as will appear from an examination of the several schedules. A part of this training is largely technical, and so is almost wholly confined to certain courses. Other parts, however, are so general in their character as to be appropriately required of all students. Among these practicums common to all, the following may be mentioned for the sake of illustration: *Drawing*, free-hand and mechanical; *Military Drill* required by the law of Congress, and helpful in securing right habits of body and mind; *Horticulture*, giving instruction in all ordinary operations belonging to fruit culture, such as pruning, grafting, budding and propagation by cutting and layers; *Mechanic Arts*, in which are learned the care and use of tools and the principal processes which lie at the foundation of all mechanical industries, without leading directly to any specific trade; and *Surveying*, which acquaints the student with the instruments of the art, and trains him to determine points, distances and areas.

Some of these practicums not only give knowledge of almost universal use, but also serve to develop, during the early part of the course, tastes and aptitudes which may determine the student's choice of a technical course and of his life work.

It may be thought that the variety of operations in the mechanic arts, for example, is so great as to make it impossible to give the student any real knowledge in the time at his disposal; it should be borne in mind, however, that this multiplicity of processes may be reduced to a small number of manual operations, and that the numerous tools employed are only modifications of, or convenient substitutes for, a few tools which are in general use. The uses of the lathe are, to a great extent, the same, whether the material is bone, metal or wood; whether the moving power be derived from the workman's foot, from the water-wheel, or from a steam engine. Again, as fitting depends on a correct eye and manual skill, the training process is essentially the same whatever the materials employed.

Mastery over a few processes and a few tools of universal application, with the methods of fitting and finishing, and with the ordinary means of transmitting and converting power, are accordingly the essential points embraced in this course. This practicum is required of all students at some stage of their course, but those who wish to devote themselves exclusively to this line of work and study enter upon the regular course in Mechanic Arts or that in Mechanical Engineering.

In the same way Surveying, though a professional art, affords so much practice in the application of mathematics, and is of so frequent practical use, that its principles are valuable to the general as well as to the technical student. It is, therefore, required of all students during the Fall session of the Sophomore year. Surveys are made with the chain, compass and transit, and, from the data so obtained, plots are made and areas calculated. Triangular and trilinear surveying, laying out and dividing up land and leveling

complete the general course. In the Civil Engineering Course this training is far more extended.

In the Technical Courses, special lines of practice have a large amount of time given them proportionate to their importance for subsequent professional use. Each practicum is directed by an instructor who is familiar with both the theory and the practice, and with their mutual relations. The instruction is so largely personal that an earnest student may advance far beyond the average attainment required as a minimum. The experience of the College adds, from year to year, to the evidence that this training is highly valuable, and in directions which could not have been foreseen.

DEPARTMENT FOR WOMEN.

Young women are admitted to all classes in all Courses, on the same terms as young men. Those not living at their own homes or at the homes of family friends, reside in a Cottage erected for their use. This Cottage furnishes a most attractive and refined home, with kindly and healthful surroundings, under the direction of a competent Lady Principal.

COURSES OF INSTRUCTION.

The organization of the College is such that the instruction given naturally falls under several departments, which are distinct, and yet so mutually related as to form, when combined in groups, well proportioned, systematic and progressive courses of study. The number of such courses is now nine, viz:

I. General Courses:

1. A General Science Course.
2. A Latin-Scientific Course.
3. A Course in Agriculture.

II. Technical Courses:

1. Biology.
2. Chemistry.
3. Civil Engineering.
4. Mechanical Engineering.
5. Physics and Electrical Engineering.

In the Courses in Biology and Chemistry the studies *are the same for the first two years* as those in the General Science or the Latin-Scientific Course, at the option of students. In the Courses in Civil, Mechanical and Electrical Engineering, the studies of those years are slightly varied with reference to the later stages of the work. The strictly technical studies fall mainly in the Junior and Senior years.

All students, accordingly, taking a regular course (other than in Civil, Mechanical, or Electrical Engineering) enter the General Science Course, or the Latin-Scientific, at the beginning of the Freshman year, continue its studies until the end of the Sophomore year, and then either complete that course or select the Technical Course which prepares directly for their chosen work. The studies of the first two years furnish a fair degree of education for those who cannot take a full college course, but who desire to fit themselves well as land surveyors, or for any of the ordinary callings of life. Students leaving at this period of their course receive from the Faculty a certificate showing the amount of work done.

The character of the several Courses of Study may be briefly indicated as follows:

1. THE GENERAL SCIENCE COURSE

May be taken as representing the general educational work of the College. It is designed to meet the wants of those who desire to obtain a sound and

liberal education through the study of the Mathematical, Physical and Natural Sciences, and the Modern Languages and Literatures, rather than the Ancient Classics. It provides a thorough training in Mathematics and Physics (with the option of Calculus in the Junior year), an acquaintance with the leading branches of Natural Science (as Chemistry, Botany, Geology, etc.), and as much study of Mental and Political and Historical Science as is found in the usual college course, while the literary studies include an extensive reading of the French, German and English Literatures and Literary History. No student can thoroughly complete this course without having acquired a stock of recent knowledge and a degree of intellectual training which will furnish an effective equipment for the duties of American life and citizenship, and fit him to enter successfully upon any chosen career.

2. THE LATIN-SCIENTIFIC COURSE

Is nearly the same as the General Science Course, with the choice of Latin, for the first five terms, in place of a portion of the Modern Languages. It is shown in full in the Schedule of Studies.

3. THE COURSE IN AGRICULTURE

Has been thoroughly recast in order to adapt it as far as possible to present requirements in both science and practice. The object of the Course is to give young men a thorough *education* at the same time that they are carefully instructed in the relations that the sciences bear to the various branches of Agriculture; to give both the mental training that is indispensable to success, and the scientific and technical knowledge requisite for becoming efficient workers in agricultural affairs, whether as practical farmers, teachers or investigators. Any lower aim would fail to meet not only the requirements of the laws under which the College is organized, but the progressive demands of the time. The constant object is to teach how the principal branches of physical and natural science are applied to the business of farming, and to afford a thorough and comprehensive knowledge of its principles and methods; to explain the nature of soils and manures, the reasons for and the best methods of tillage, the constituents and characteristics of plants and animals, and the conditions favorable to their development. Practice is combined with theory whenever the processes involve skilled labor, but the student's time is not consumed in merely manual operations.

As will be seen by an examination of the schedule of studies and practicums of this course, the time is fully occupied with instruction in the class rooms, laboratories, orchard, vineyard and field, and no pains will be spared to give the earnest student a high degree of intellectual training, and thorough special preparation for the most advanced requirements of a farmer's calling. Increased teaching force and equipment have been provided for this department of instruction, and the opportunities offered to young men were never so complete and satisfactory as at the present time.

The studies of the first two years include Mathematics, Surveying, the general principles of the Sciences, the French and German Languages, and

Rhetoric, with Latin for those who desire it, together with an extensive course in Agricultural Chemestry. The direct application of science to agriculture is taught from the beginning of the course; the consideration of purely technical subjects is more fully taken up during the last two years, after the student has gained a sufficient basis of general knowledge. Instruction is given in connection with text-books, whenever suitable ones are available, but in some cases the subjects are of necessity presented by lectures.

PRACTICUMS.—It is intended that the management of the College farms shall be such as is sanctioned by the teachings of science and practice. Of this management, in its various details, the students of the Course in Agriculture are to be observers, taking part in actual labor to the extent that is necessary for proper instruction. The object of the practicums will, in all cases, be to secure from the student a report of the operations coming under his notice, with a discussion of the principles and a criticism of the methods involved. The facilities for becoming familiar with the growing of ordinary farm crops, the use of commercial fertilizers, the composition and use of farm manures, and the feeding of animals for the production of meat and milk are now ample for both elementary and advanced instruction.

SPECIAL SHORT COURSE.

Besides the regular course of instruction, arrangements have been made to give an extended course of Lectures on strictly agricultural subjects durthe winter months. They will be of a wholly practical character, and as serviceable to adults as to youth. The Lectures will be open to all who desire to enroll themselves as attendants, and *no examination or fee* will be required for admission. Rooms will be provided in the College for as many persons as possible, in which cases the same rent will be charged as to regular students. Circulars giving full information, and showing the course in detail, can be obtained on application to Professor H. J. Waters.

4. TECHNICAL COURSES.

The instruction in these Courses (enumerated on page 12) is designed for those who wish to become practical or professional chemists, metallurgists, manufacturers, electricians, civil and mechanical engineers, or teachers and investigators in these and similar lines of professional or industrial occupation. They are sufficiently described under their respective heads on subsequent pages.

5. SPECIAL COURSES

Have been established in *Chemistry* and in *Mechanic Arts*, besides a *Ladies' Course in Literature and Science.*

The special Course in Chemistry, of two years, is designed to afford those who, for any reason, are unable to take a full course, opportunity to acquire a practical working knowledge of some of the leading facts, principles, methods and applications of this important branch of science. Students in this course are expected to devote more than the usual proportion of time to

laboratory and other technical practice, and thus to compensate for shortness of time by increased diligence. Only so much of other studies is introduced as is requisite to secure full employment of time and some moderate degree of general cultivation. The course is shown in detail on a subsequent page. Students completing this course receive a special certificate.

The Course in Mechanic Arts covers three years. A full statement is given on subsequent pages.

The Ladies' Course in Literature and Science, contains such branches of study as are thought likely to be especially serviceable to those who cannot take one of the regular four years' courses, the requirements in mathematical and scientific studies being less extended. The course in detail is shown in the Schedule of Studies.

6. ELECTIVE COURSES

Students of mature years, and younger students whose parents or guardians request it, are permitted to choose (among college studies) such special branches as they may desire.

Such students *must at least be prepared to pass examination on the subjects required for admission to the Freshman class,* in order that they may pursue with profit the studies chosen. They are required to have the same number of hours of class work and practicums as other students and to take regular part in rhetorical and other general exercises. Subject to these requirements, and to the ordinary discipline of the College, any person is at liberty to select from the studies of any given session such branches as he may be found fitted to pursue, and as the arrangement of classes will allow, the purpose being to bring the advantages of the institution as fully as possible within the reach of every young man and woman in the State.

Students are earnestly advised to enter one of the Regular Courses, and pursue it systematically to the end; but, in cases where that is not feasible, IT IS INTENDED TO MAKE THE STATE COLLEGE, TO THE FULL EXTENT OF ITS RESOURCES, A PLACE WHERE ANY PERSON MAY OBTAIN THAT KIND AND DEGREE OF EDUCATION WHICH IS MOST DIRECTLY SUITED TO HIS CIRCUMSTANCES AND PURPOSES IN LIFE.

To those who satisfactorily complete one year or more of such special work, certificates, under the seal of the institution, are given, setting forth the studies which they have pursued, and their proficiency therein. The provision for partial courses applies only to students in College classes.

7. AGRICULTURAL EXPERIMENT STATION.

The Agricultural Experiment Station, as a distinct branch or department of the College, was organized by the Trustees in 1886, in accordance with the provisions of the act of Congress, generally known as the Hatch act. The College had for several years carried on extensive lines of research and experiment, and these are being continued and greatly enlarged under the new organization.

The funds specifically devoted to the work of the Station are expended in making such experiments and investigations as seem best adapted to render

practical and efficient aid to the farmers of the State in the pursuit of their calling. Various experiments of this sort have been completed and numerous others are now in progress. The results are published quarterly in the form of bulletins, and the year's work is summed up in an annual report. Both reports and bulletins are printed for gratuitous distribution, and will be mailed regularly, free of charge, to any citizen of the State applying to the Director, Dr. H. P. Armsby.

The Station also invites correspondence and suggestions from farmers and others interested in its work, and inquiries upon matters pertaining to agriculture or horticulture will be cheerfully answered by the Director, as far as possible.

DEPARTMENTS OF INSTRUCTION.

The following statement will show more fully the method and scope of work of the principal departments which are combined to make up the foregoing courses:

1. COURSE IN AGRICULTURE.

The instruction is so arranged as to begin the study of technical subjects in the Freshman year, and to continue them throughout the course. At least one technical study is taught every term of each year. Those technical subjects requiring the least previous preparation are taught in the earlier part of the course, while the student is securing a training in English, Mathematics, Elementary Chemistry and Modern Languages, which are essential to his further studies.

Inasmuch as agriculture involves so large a number of the sciences, the student is given a broad training in those studies. The studies in general science are: Chemistry, three terms; Botany, three terms; Biology and Zoology, three terms; Physics, two terms; and Geology, two terms.

History, Political Economy, Constitutional and International law are taught as a preparation for the duties of citizenship. No class of citizens have greater need than farmers of a clear understanding of public questions as they affect themselves and the public interest.

What may be considered the technical or special studies of the course are arranged in the following order:

RURAL ECONOMY.—Farm management and plans; kinds of farming, as general, special, intensive, extensive, stock, dairy and grain, and the essential elements of success in each; farming as a business; marketing; relation of farming to other industries; the farmer as a producer, manufacturer, merchant, transporter and consumer.

RURAL LAW.—A study of the laws which most directly concern farming.

FARM APPLIANCES AND BUILDINGS.—Kinds and adaptation of farm implements and machinery; application of different kinds of power to farm purposes; plans and essential features of farm buildings; fences, roads and water supply.

AGRICULTURAL CHEMISTRY.—Taught by lecture, with references to Johnson's "How Crops Feed" and "How Crops Grow."

Plants.—How they grow; the chemical elements indispensable to their growth and the compounds from which plants can take them up; how plants feed; the compounds formed in the plants; variations in plant composition due to differences in species, variety, stage of maturity, climate and supply of plant food; germination; fermentation.

Chemistry of soil and water.—Mineral basis of the soil; composition of rocks; changes due to weathering; translocation and deposition of soils; classification of soils; mechanical analysis; formation of organic matter in the soil; its composition, the changes it undergoes, and its uses; nitrification; power of soil to fix chemical compounds introduced; its relation to losses in drainage; the air and water of the soil; composition of river and mineral waters as compared with rain water; soil heat in its relation to soil chemistry.

Improvement in the soil.—Chemical effects of tillage, drainage, irrigation, addition of sand, burning and fallowing.

Fertilizers.—Indirect fertilizers—Effects of lime and other compounds of the earthy bases.

Direct fertilizers—Phosphates, potash salts, nitrogenous compounds—their sources, manufacture and use. Green manures; stable manure and its preservation; sewerage and factory waste; composting.

Maintenance of fertility. Fertilizer theories; relation to systems of agriculture.

Practicums.—Include lectures and laboratory practice, on the methods of quantitative analysis applied to fertilizers, rocks, soils, foods, milk, etc.

STOCK FEEDING.—

Animal Chemistry.—General composition of animal body; chemistry of digestion and absorption; the blood; body wastes; functions of the various nutrients in the formation of tissue and the production of heat and work.

Feeding stuffs.—Composition and digestibility as affected by soil, manure, rate of seeding, etc., etc. Sources, composition and uses of bye fodders. Preservation and preparation of fodders—hay-making, ensilage, steaming and cooking feed.

Feeding for special purposes.—Nutrients, fodders and rations. Feeding standards, calculation of rations. Fuel value of fodders and rations. Maintenance rations. Excess food.

Feeding working animals.—Influence of work on metabolism. Source of muscular power.

Feeding for meat production—Beef, mutton and pork. Differences in nutrition of young and mature animals. Growth and fattening. Influence of food on carcass.

Feeding for milk—Nature and composition of milk; formation of milk in the udder; influence of food on yield and composition of milk; effects of breed, individuality, period of lactation, etc.; effect of feed on quality of dairy products.

ANIMAL HUSBANDRY. — Principles of stock breeding—heredity, atavism, variation, laws of correlation, terms used—thoroughbred, in-breeding, pedigree; parental, mental, climatic influences; controlling sex; selection; period of gestation. Care and management of live stock; handling and training.

History, characteristics and purposes of breeds of live-stock. A few of the leading types of live-stock are kept on the farm, which give the students opportunity for judging and scoring and for studying the essential points of breeds adapted to different purposes. Some of the finest specimens of many of the breeds are illustrated by lithographs, photographs and lantern slides. By means of herd-books and other historical literature on such subjects, the methods of producing these specimens are studied. Students wishing to make a specialty of any particular breed or breeds will be afforded facilities and directed in the way of doing so.

DAIRY HUSBANDRY.—Statistics of products and consumption; adaptation to certain sections; winter or summer dairying, dairy or creamery; characteristics, testing and selling of milk; butter and cheese making; effect of foods on products; breeds of dairy cattle, their rearing, management and replenishment.

SOILS.—Kinds; physical properties; cultivation, drainage and irrigation.

Cultivation.—Reasons, methods and appliances.

Drainage.—Practical details of farm and road drainage; leveling and locating drains, material, size, shape, depth, grade and number; effect of drainage; cost and profit; machines and appliances.

Irrigation.—General features; adaptation to localities; methods; surface or sub-irrigation.

FARM CROPS.—The history, production, uses, chief characteristics and essential elements of successful culture of each of the principal farm crops. For example, the subject of Indian corn is treated under the following heads: History, production, use, structure, cross-fertilization, chemical composition, climate, soil, varieties, vitality, culture, harvesting.

HORTICULTURE.—Instruction in Horticulture is given largely by the practical operations of the garden and orchard, such as pruning, grafting, budding and making cuttings and layers.

Fruits.—Methods of propagation; preparation of ground; cultivation and after treatment. Storage and marketing; hybridization and origination of new varieties; diseases and their remedies.

Vegetables are considered in the same general way. The history and peculiarities of individual varieties are studied and also the best methods employed in their cultivation.

Ornamental plants; their nature and use in landscape gardening.

The aim is to cover all parts of the subject of Horticulture and, in green-houses, gardens, orchards and grounds of the College, students have a most excellent opportunity for seeing a great variety of both the useful and ornamental plants under cultivation and experiment.

ECONOMIC ENTOMOLOGY is taught in connection with the study of Zoology. The structure and life history of insects are fully studied, after which special study is made of the principal beneficial and injurious species.

METEOROLOGY.—Abercromby's Weather, supplemented by lectures.

COMPARATIVE ANATOMY is taught in connection with the study of Biology and Zoology.

VETERINARY SCIENCE.—Preventive measures, common accidents, principal diseases among farm animals.

HISTORY OF AGRICULTURE in those countries from which we derive our agricultural practices and products; American agriculture; present agricultural methods in foreign countries.

FORESTRY, including not only a study of various forest trees, and their uses, but also the production and conservation of forests and forest conditions. Instruction will be chiefly by lectures, and the subject will be made as practical as possible.

2. SHORT COURSE IN AGRICULTURE.

A set of lectures on technical agricultural subjects will be given during the winter term. The lectures for the winter of 1892 begin Wednesday, January 6, and continue twelve weeks.

While all applicants over fifteen years of age will be admitted without examination, the better the previous preparation the greater will be the benefit obtained by those attending the lectures.

These lectures are designed for those whose time for the study of this subject is limited to one or two winters. It is the aim to give as large an amount of thoroughly useful information about farming and gardening and the principles underlying the art as time will allow.

The lectures will be divided into four general heads, viz: *Agriculture; Agricultural Science; Horticulture and Economic Entomology; Veterinary Science.* These lectures will be given by men who have had special training in the several lines of which they treat.

LECTURES.

1. Agriculture—60 lectures treating of

Farm management,
Drainage,
Road making,
Breeds, breeding and management of live stock,
Dairying,
Cultivation of farm crops.

The *practicums* in this line will consist of practice in the measurement, planning and mapping of farms and farm buildings; leveling for drains and roads; practice in judging live stock; practice in handling milk and making butter by various approved methods; taking notes upon the feeding and management of live stock on the Experimental and College farms, as well as taking notes upon the various operations of each.

2. Agricultural Science—60 lectures treating of

elementary notions of chemistry and physics; chemical elements of agricultural importance and some of their compounds. Chemistry of air and water.

Soils.—How they are formed; their chemical and physical differences.

Plants.—How they grow; the chemical elements indispensable to their growth and the compounds from which plants can take them up; how plants feed; the compounds formed in the plants; variation in plant composition due to differences in species, variety, stage of maturity, climate and supply of plant food; germination, fermentation.

Animals.—General composition of animal body; chemistry of digestion and absorption; the blood; body wastes; functions of the various nutrients in formation of tissue and production of heat and work.

Feeding stuffs.—Composition and digestibility as affected by soil, manure, rate of seeding, etc., etc. Sources, composition and uses of bye fodders. Preservation and preparation of fodders—hay-making, ensilage, steaming and cooking feed.

Feeding standards and calculations of rations. Growth and fattening; feeding for meat, milk, wool, etc.

Milk, its nature and composition, variation in composition as affected by food, breed and individuality. Effect of feed on quality of dairy products.

Practicum.—Milk testing—one hour per week.

3. Horticultural and Economic Entomology—60 lectures treating of

the ordinary vegetables and fruits. Their treatment and cultivation, together with their insect enemies and the best methods of destroying the injurious kinds. Greenhouses and other facilities make it possible to give a practical course on these subjects even in the winter season.

4. Veterinary Science—24 lectures treating of

common diseases and accidents, with Clinics once a week.

Students may select between practicum in Agriculture and Horticulture according to their individual needs and desires, and thus emphasize that line of work to which they wish to give the most attention.

This course is not intended in any sense to take the place of the regular four years' course, but to supplement it. It is hoped that this short course will meet the wants and needs of a large body of earnest, bright young men in the Commonwealth of Pennsylvania, who wish a fuller knowledge of modern farm methods. It should in no case be taken as a substitute for the more thorough, and hence in the end more practical four years' course.

Every young man, who has the time and means should take the more extended course. The largest measure of success involves such a wide range of knowledge that the most thorough technical training is required.

No charge will be made at present to persons attending these lectures, except the fee of five dollars to cover incidentals, and the small laboratory fee in special cases. Rooms in the college dormitories cannot be guaranteed, but will be provided at the usual rate as far as possible. Those who desire to attend should make application as long in advance as possible.

3. BIOLOGY.

A Course in General Biology is given during the Winter and Spring sessions of the Sophomore year. In the lecture room typical forms of vegetable and animal life are taken up, particular attention being paid to the general principles common to all living things. In the laboratory the forms considered in the class-room are placed in the hands of the students for description and study. Among the objects thus studied are Yeast, Penicillium, Bacteria, Amœba, Chara, Fern, Flowering Plant, Hydra, Earthworm, Crayfish, Clam, Frog, Bird and Mammal. This course is given as an introduction to the courses in Botany and Zoology which follow. At every stage of the work the student is taught the principles and assisted to form the habit of original observation and research.

(*a*) *Botany, Forestry and Horticulture.*

BOTANY.—The work in Botany follows directly upon completion of the course in General Biology. For the first session the subject is treated as a whole, and aims to comprise the general principles of the science. The text-book used at present is Bastin's College Botany, and the laboratory work is entirely on the gross and microscopic structure of plants. Particular stress is laid upon drawing and written description, as evidence that work is done carefully and understandingly. The second session is devoted to Cryptogamic Botany. The laboratory exercises consist of practical examination of the lower plants, tracing their life histories and economic relations. The study of the Fungi is, naturally, a prominent feature during this time. With such as take a third session in Botany, the flowering plants are considered with particular reference to their uses. The analysis of plants is treated with sufficient fullness to enable a student so inclined to thread his way to any flora, but the collection and preparing of a herbarium is not required.

The opportunities afforded in this department are unexcelled. The laboratory has plain and convenient working tables, and, for each student, both

simple and compound microscopes of improved pattern, together with the various accessories required for careful and correct work. Students are required to cut and stain sections and to become familiar with the use and manipulation of the microscope and microscopical material in botanical study. Frequent use is made of the herbarium and specimen collections for illustration and reference. The garden, greenhouses and grounds of the institution are constantly receiving additions of material, both native and cultivated, while the flora of the neighborhood is fully equal to that of any part of the Allegheny district. A botanical library contains the recent standard books in the science.

FORESTRY.—The instruction in Forestry consists of lectures in connection with Hough's Elements of Forestry, during the Spring session of the Senior year. At this time, near the end of the courses of study, the students are, by their maturity and previous training, fitted to consider profitably one of the leading scientific and economic subjects of the day.

The value of forests, from both climatic and economic considerations, is treated of, together with the best available methods for their conservation and replacement.

The botanical collection contains many specimens of wood and other illustrative material, while upon the College grounds are to be found most of our indigenous trees and some others. Two small artificial plantations of of trees are maintained on the place, and a larger experimental tract on an adjacent mountain.

HORTICULTURE.—The instruction in Horticulture begins in the Freshman year. It is given partly by practical operations in the garden and orchard, and partly by lectures upon the best methods of the cultivation and propagation of plants. In the Fall, students gather various kinds of seeds from the flower garden to be preserved until Spring, make "cuttings" for the propagation of those plants which are best rooted in the Fall, and students who have advanced work conduct such operations in cross fertilization and hybridization as will produce early results and illustrate the important points of previous lectures on those subjects. In the Spring term the subjects of pruning, grafting, budding, etc., are fully considered, and the instruction is impressed upon the mind by such practical work as the season and material permit. To advanced students lectures are given on all the most important fruits in cultivation, their history, varieties, diseases and insect enemies; also, on the principal plants grown for cut-flowers. For example, the rose is treated under the following heads:—Its history; original species, classes and varieties; propagation; soft-wood cuttings, hard-wood cuttings, budding, grafting; cultivation; pot-culture, winter blooming, diseases and insects.

On the same plan are treated the Carnation, Bouvardia, Violet, Dutch bulbs, etc.

Students in horticulture have access to the conservatory and greenhouses where they find a large variety of plants flowering and being propagated in their proper seasons. The botanical garden includes many perennials to which are added each Spring a variety of annuals. On the Campus may be found a large number and variety of evergreen and shade trees as well as of flowering shrubs, the observation and study of which enables the student to become acquainted with the materials used in Landscape Gardening.

(*b*) *Zoology, Entomology and Physiology.*

Zoology begins in the Spring session of the Junior year, the animals treated being the lower invertebrates. In this session, besides considering typical examples of the different groups, special attention is paid to those animals which as parasites or otherwise are most important to man. About half of the Fall session of the Senior year is devoted to the study of Entomology, the insects chosen for consideration being either injurious or beneficial. The structure and life history of these forms is carefully studied, together with the remedies and other methods for holding in check the different insect pests. The last half of the Fall session and the entire Winter session are devoted to the consideration of the groups of animals not previously studied, the subject of comparative anatomy occupying the greater portion of this time.

(*c*) *Advanced Biology.*

For those who intend to become physicians, or who, for other reasons, desire to pursue the study of biological subjects farther, a course in Advanced Biology has been arranged, with reference to the increasing demand that physicians should have had preparatory courses in Chemistry, Botany, Zoology, Anatomy, Histology, Embryology and Physiology, before taking up the more strictly medical subjects. This course diverges from the General Science and Latin-Scientific courses at the beginning of the Junior year. During the Fall session of that year, students in Biology take up Mammalian Histology, which is treated with direct reference to Pathology. In the Winter session the subject of Advanced Physiology is considered, the principles of Digestion, Circulation, Respiration, Nutrition and Excretion receiving particular attention.

Arrangements are now being perfected by which graduates of this course will be received at a number of medical colleges in advanced standing, thus reducing the time usually required for a medical course.

Throughout the biological studies, specimens from the Botanical and Zoological collections are constantly used for illustration and objective work. With this in view the collections are continually being added to, and donations will be gladly received.

4. CHEMISTRY.

During the Sophomore year, the work of the students in all courses consists of lectures, recitations and practical laboratory work in General Chemistry. The instruction is given by lectures following, during the Fall term, the order of Harris' Lecture Notes on General Chemistry, which is also used to a considerable extent as a text-book. Frequent review recitations and examinations, with the giving of stoichiometrical and other problems involving the application of the facts and principles considered, serve to fix and make exact and definite the knowledge acquired. During this term the non-metals are considered, and the practicum, of four hours per week, is brought into as close relation as possible with the work of the lecture-room. It consists of illustrative experiments on the elements considered and their chief compounds, teaching the manipulation and construction of apparatus, and a series of experiments on the weight, composition, etc., of the chief gases and vapors bearing directly on the theory of Chemistry.

In the Winter term the metals are taken up, special attention being given to those metals and compounds which are of industrial importance, and, in addition to the lecture material, Bloxam's Chemistry is placed in the hands of the student for reference. The practicum consists of laboratory work in Qualitative Analysis, following Harris' Manual of Qualitative Analysis, frequent reference being made to the larger works. Constant drill is maintained on the reactions observed and the properties of compounds, so as to render the practicum a logical exercise in pure Chemistry and not merely a practice in manipulation and the empirical use of analytical methods.

The work of the Winter term places in the hand of the student all the reactions, by wet and dry methods, generally used in Qualitative Analysis, but it acquaints him merely with the analysis of simple compounds, especially those which are met with in the ordinary work of the Analytical Chemist. The skill thus acquired is employed in the Spring term in the true field of analysis :—the detection of substances in mixed solutions and solids, the separation of bases and the building up of a systematic course in Chemical Analysis.

The chemical studies of students in the General Science and Latin Scientific Courses, and in the Technical Courses not directly related to Chemistry, end with the third term of the Sophomore year.

In the Junior year of the Course in Chemistry, the lecture-room work consists of recitations in Remsen's Theoretical Chemistry and in Quantitative Analysis ; the object of the latter being both to keep the student's attention fixed on the principles underlying the work he actually performs, and to give him some acquaintance with other analytical methods. In the

second term a course in Organic Chemistry is commenced. Lectures on this subject are introduced thus early in the course in order that sufficient familiarity with the subject may be acquired, to enable the student to commence with profit at the beginning of the Senior year a practicum with the compounds of carbon.

Practicum work in the Junior year consists of laboratory work in Quantitative Analysis. Methods selected from all approved sources are employed. The work of the year is so planned as to give facility in the use of the standard analytical methods, gravimetric, volumetric and electrolytic, and to impart familiarity with the methods for the determination and separation of the substances most frequently met with.

In the third term the practicum of the Junior Class in some of the courses includes, also, laboratory work in Determinative Mineralogy. It is intended that this practical course, with the few accompanying lectures, shall result in a knowledge of the outlines of the science of Mineralogy, and the power to distinguish the more common minerals and ores, approximately by the eye, and accurately by the blow pipe.

In the Senior year the time of the student in this advanced Course is given, in both class-room and laboratory, almost exclusively to Chemistry. A series of conferences on Chemical Technology is held during one term, in which special attention is paid to the metallurgy of iron and to other processes that are likely to come under the observation of the student, or to occupy him after his graduation. In the presentation of the subjects, descriptions and illustrations of modern processes now in actual use are employed as fully as possible. Instruction in Plant and Animal Chemistry is given by the Professor of Agricultural Chemistry during the Winter and Spring terms.

The practicum work occupies the greater part of the time and attention of the student during the year. About half of the year is given to Organic Preparations and ultimate Analysis. For the rest, the work of the individual student will vary according as he has in view further study, practical work in applied Chemistry, or the best general knowledge of Chemistry attainable in the time. The subjects of Assaying, Sanitary Chemistry, including the Analysis of Water, Urinary Analysis and Toxicology are designed to be brought in as time will allow; but, in any case, the tendency will be toward some department of work, with reference to the selection of a definite subject of investigation which shall occupy at least the greater part of the third term and be the basis of the graduation thesis.

The text-book work of the students in the Special Course in Chemistry is essentially the same as that of the Sophomores and Juniors. Their practicum work is greater in quantity, and to some extent different in arrangement. The first year students take Determinative Mineralogy with the Juniors.

The students pay a fee for the use of the laboratory, and are charged with value of apparatus destroyed and chemicals used. The expense of laboratory work varies with the habits and care of the student. Students are required to deposit ten dollars at the beginning of each term. A careful account is kept with each one, and balanced at the end of each year, or at the close of a student's connection with the laboratory. The new laboratories afford unusually good facilities for all lines of chemical work, and the equipment, already excellent, is rapidly increasing by frequent additions. An

excellent chemical library is also contained in the College library, including many of the most important periodicals, while all those works which are needful for daily reference are always at hand in the laboratory.

5. CIVIL ENGINEERING.

The work of this course is arranged with reference to the demands made upon the Engineer by the theory and practice of his profession. The harmony between these, and their close mutual relations and dependence are dwelt upon and developed as giving the broadest grasp and clearest conception of the actual problems arising in professional work—problems that demand the ability to design, or plan, or execute, and which combine both the science and the art of Engineering.

The theory, and a portion of the practice, is taught by text books, lectures, theses, and work at the drawing-board; the remainder of the practice, by field and shop work, draughting, model construction, and visits to points of engineering interest.

The technical studies begin, in the Spring session of the Sophomore year, with Descriptive Geometry and the Principles of Mechanism. Special attention is given to the study of the former, not only because a thorough knowledge of it is essential to the practical Engineer, but also on account of its importance as an instrument of mental training. Sufficient time is allowed to enable the student to apply its principles to: (1) Problems on right lines and planes, warped, and single and double curved surfaces; (2) Spherical Projections and Map Drawing; (3) Shades and Shadows, and Isometric Projection; (4) Stereotomy, including the solution in the drawing-room of original problems under each subdivision.

Mechanics, owing to its great importance, is taught throughout the Junior year, the Fall session being devoted largely to rational methods. Analytical and graphical methods are developed coincidently, the purpose being to accustom the student to choose intelligently which of the methods to use, or when to combine them. Surveying, Least Squares, Practical Astronomy and Geodesy, and Engineering Structures complete the work of this year. During the Senior year, the time allotted to technical subjects is devoted to lectures on the several branches of Civil Engineering, viz: Sewerage and Drainage, Hydraulic Engineering, River and Harbor Improvements, Economics of Roads and Railroads. Designing is made a prominent feature in the work of this year, and much time is devoted to it. In order to familiarize the student with the legal forms used in connection with every engineering work of importance, the subject of Engineering Specifications and Contracts is taught, and this, together with Heat, Steam and Steam Engines, and Hydraulic Motors, completes the work of the Senior Class.

During the Winter and Spring sessions of the Senior year, the student is required to prepare a graduation thesis, which must show satisfactory evidence of independence of thought in considering and treating Engineering problems.

PRACTICUMS.—Although methods of practical work, and rapidity in executing them, can be learned only from experience, yet there is much of the routine of work of the Engineer in field and drawing-room that can be brought within the scope of the student's practical training, and his work is arranged with reference to this fact. The practicums of the Freshman year are Drawing and Shop Work, the latter consisting of the Principles of Carpentry, Wood Turning and Metal work. During the Sophomore year, there is added Land Surveying, Descriptive Geometry and Chemistry. During the Junior and Senior years, the field work includes Railroad Surveying, Geodesy (measuring base line and triangulation), Topographical Surveying, Determination of Latitude, Time, Azimuth and Barometric Leveling. The College is so situated that the operations of surveying can be carried out on a large scale, and thus made in a marked degree practical. During the Winter sessions, the practicum time is given to Engineering, Draughting, Computations and Model Construction.

6. GEOLOGY.

Geology is taken up in the Senior year. Since it enters in part into all the courses of study, and the Fall term only is available for out-door work, the general principles of Stratigraphy are first considered, next Historical Geology, and last of all Dynamical. The text-book and practicum are carried on hand in hand as far as possible. Field work is considered to be of great advantage, and the frequency and distance of excursions is limited only by the weather allotted to them. The neighborhood affords excellent opportunities, particularly for structural geology. The great anticlinal and synclinal paleozoic waves east of the Alleghenies are here shown in every variety of position and angle of inclination, and good out-crops are to be seen of nearly all the sub-divisions of the paleozoic rocks from the lowest to the coal measures. The geological museum comprises the collection of the First Geological Survey of the State, duplicates of the Second Survey now in progress, a number of fine European specimens, and good representative fossils, particularly from the Silurian and Devonian ages. Dana's Text-Book and Manual are the chief books used. Many of the leading treatises on Systematic and Economic Geology, together with the Reports of the Geological Survey of the State are to be found in the library and are frequently referred to.

7. GRAPHICS—*Industrial Design.*

The rapid development of the work in the Departments of Civil and Mechanical Engineering, within the last few years, has been accompanied by an equally important extension of the work in free-hand, industrial and mechanical Drawing. Instruction in this subject, however, is not confined to the Technical Courses, but, on account of its great value as a means of training the perceptive faculties and its almost numberless applications in every art and trade, it occupies a considerable portion of the practicum time in every course. In the Preparatory Department a good foundation is laid for this work.

During the Fall session of the Freshman year, the student is instructed in free-hand and elementary projection drawing. This is followed during the remainder of the year by mechanical drawing, and the fundamental principles of isometric and oblique projections and shading. The students also make working drawings in connection with their practicum in mechanic arts. During the Junior and Senior years, the course comprises mechanical and engineering drawing, copying from the flat and from models, topographical sketches and maps, isometric and plane projections, plotting surveys and triangulations, lettering, map drawing, coloring and shading.

Provision has been made for special instruction in Industrial Art and Design, with a view not only to introduce this branch of Drawing as far as practicable into all the courses of study, especially the Technical courses, but to provide a distinct department of training for those who wish to study Art in its applications to Industry or to find a career of life-work in this field.

The course begins with drawing from the object, as geometrical solids, casts, plants, furniture, etc., passing as early as possible to processes which awaken the inventive faculty and cultivate the habit of original expression by means of form and figure instead of words. Special attention is paid to the applications of the artistic element to commercial products, wall paper, oil cloth, wrought iron, etc., and it is believed that this may prove, particularly for young women, an opening to agreeable and remunerative employment.

8. LANGUAGE, LITERATURE AND CRITICISM.

RHETORIC AND THE ENGLISH LANGUAGE.—Rhetoric is taken up by the Freshman class during the first and second sessions. In the Fall session particular attention is paid to the fundamental processes of English composition, special care being given to verbal criticism, grammatical analysis and the construction of themes in outline. During the Winter session "Genung's Practical Rhetoric" is taken as a text-book, and careful attention is given to expository and argumentative writing. In connection with the Rhetoric, the "Analysis," of the same author, embracing selections from English prose writers is extensively used by the class. During the third session, three hours a week are given to the study of Old English, Morris' "Specimens of Early English" being used as a text-book.

In addition to the recitation and practicum work above outlined, Essays and Orations are required throughout the entire course, together with the study of English Literature in the Junior and Senior years, thus affording abundant opportunity for practice in the application of the principles of English composition and criticism.

ENGLISH LITERATURE.—During the last session of the Junior and the first session of the Senior year, students in both General Courses study selected works of the classical writers, beginning with Chaucer and his contemporaries. The authors chosen and the method of study adopted are such as to give the student an acquaintance with historical changes in grammatical form and in vocabulary, as well as to call attention to purely literary qualities.

During the last session of the Senior year, Gilman's First Steps in English Literature is used as a basis for the study of the history of the literature, with reference to its development, the characteristics of different periods, and the date, works and literary merits of the more prominent authors.

LOGIC.—Juniors, during their first session, pursue this subject, using as a text-book Day's Elements of Logic. The chief aim of the course of instruction is to secure a thorough comprehension of the laws of thought—such a comprehension as will enable the student, without depending upon any mere formula, to apply those laws confidently and correctly to all processes of reasoning. With this view, the text-book is supplemented from other sources, especially in inductive logic, and additions are made to the large collection of material for practice supplied by the text-book.

LATIN.—During the first year in College, the student is expected to become thoroughly grounded in the forms of words and their purely grammatical relations. In the latter part of this course, the general scope of pas-

sages and the logical relations of their parts, together with the purely literary qualities of the works read, are the leading subjects of study.

The selection of matter is such as to acquaint the student with the masterpieces of the great poets, historians and orators of Rome. In connection with the literature, attention is given to the history and the antiquities of the Romans, in order that students may thus acquire that knowledge of their religion, government, art, and home life, without which neither a race nor its literature can be comprehended.

FRENCH, GERMAN AND SPANISH.—The French and German languages and literatures are regular studies in the General Science course, until the end of the Winter session of the Junior year, an option between the two being allowed in some portions of the course. The aim is to give the student such knowledge, practical and theoretical, as will enable him to use the languages in connection with the work of the Technical Courses, besides that training of the critical faculty which comes from the study of foreign modes of thought and expression.

Provision is made for the study of the Spanish language as an elective, whenever possible.

Oral and written translations and black-board exercises are required in order that the tongue and ear, as well as the eye, may be cultivated. Following this is a course in classical and contemporaneous literature and the history of literature. A short course in "Scientific German" also is given during the Sophomore year. Standard reference books are placed at the disposal of the students, and the new ones are added from time to time as required.

9. MATHEMATICS AND ASTRONOMY.

Mathematics, on account of its importance as a disciplinary study, and its wide application in the practical affairs of life, occupies a prominent place in all courses of study. The course is the same for all students until the last session of the Sophomore year, and consists of Algebra; Plane, Solid and Spherical Geometry; Plain and Spherical Trigonometry and their application in surveying; and General or Analytical Geometry, two terms. After this, students in the General Science Course have an option of Differential and Integral Calculus; Calculus is required in the Courses in Chemistry, Physics, and Civil, Electrical and Mechanical Engineering. The students in all the courses have further applications of Mathematics in Mechanics, Physics and Astronomy.

ASTRONOMY.—The course in Astronomy aims to give not merely an application of Mathematics, but also a knowledge of the physical conditions of the universe, the laws which govern the motion of the celestial bodies, and

an insight into the methods by which the science has been brought to its present state. The student is taught the causes of many of the phenomena of the heavens, the methods of finding the distance, magnitude and mass of the sun and the planets, and the principles by which eclipses are predicted. He is also required to compute the time of several eclipses that have not yet occurred.

10. MECHANIC ARTS.

This course has been in full operation since September, 1884. The course is designed to afford such students as have an ordinary common-school education an opportunity to continue the elementary scientific and literary studies, together with mechanical and free-hand drawing, while receiving theoretical and practical instruction in the various mechanical arts.

The instruction in shop work is given by means of exercises so planned as to include, in a systematic manner, the operations in use in the various trades, but, the object being to give instruction in the use of tools, only such constructions are made as cover principles, without undue repetition.

The first instruction in carpentering and joining is in the use of the saw and plane in working wood to given dimensions, and a series of elementary exercises follows in order, such as practice in making square joints, different kinds of dove-tails, the various tenons, roof-trusses, panels, etc.

The instruction in turning and circular-section patternmaking also is given from a series of exercises.

In the forge-shop are taught the management of the fire and the degree of heat necessary to forge different metals. Drawing, forming, bending, upsetting, fagoting, splitting, punching, chamfering, annealing, tempering, case-hardening, etc., are taught by means of a series of exercises in which the elements of the iron-forger's art are particularly dwelt upon. Every piece is made to certain dimensions laid down upon the drawing, the article being forged before the class by the instructor who directs attention to the essential feature of the operation, which is then repeated by each studen.

The course in vise work includes filing to line, filing to template, free-hand filing, fitting, and chipping straight and grooved surfaces in cast-iron, wrought-iron and steel.

In the machine shop, the student, after having the lathe and its mechanical construction explained to him, is taught centering, tape-turning, chucking, reaming, inside and outside screw-cutting, bolt-turning, etc. He is then required to construct some piece of mechanism in which many of these principles are involved.

The drawing of this course extends through the entire three years.

This work is looked upon as of the highest importance, and the effort is to make the instruction thorough, practical and of direct utility. Considerable time is devoted to free-hand drawing, and it is believed that it not only assists in mechanical drawing but it is of great service in after years, whatever the occupation chosen.

The mechanical drawing consists of a series of exercises, and such are selected as will be of subsequent use. They are arranged in progressive

order, beginning with geometrical constructions involving straight lines and circular arcs only, and ending with the more complex curves, such as the ellipse, helix, epicycloid, etc.

Projection is next taken up. The instruction in this is from models, so that the student may have before him the actual object from which the projection is made, and not be obliged to depend upon his unaided conception. After completing this work he is required to draw parts of the machines from actual measurements. For this purpose he is given some piece of mechanism to sketch and measure, of which, finally, he is to make complete working drawings.

The mathematical instruction of the course covers Algebra, Plane and Solid Geometry, Plane and Spherical Trigonometry and Land Surveying, taught with special reference to this class of students, many practical applications being made. The department is already well equipped, but additions of machinery are being made, from time to time, to meet the requirements of the course.

11. MECHANICAL ENGINEERING.

The object of this course is to enable the student of Mechanical Engineering to recognize and apply such natural forces and materials as are adapted to his uses. In order that he may be capable of intelligently and skilfully designing, constructing and supervising all kinds of machinery it is necessary that he should pursue a thorough and extensive course of training, both theoretical and practical.

While theoretical work in such a course is of primary importance as affording a mental discipline not to be derived from practical research, it will be seen that the latter is made to go hand in hand with the former, it being believed that from continual practical applications of theoretic conclusions a broader and more tangible conception of their truths may be derived. It is not, then, at the expense of the abstract mathematical law that time is given to show how it may be involved in the construction of the simplest machine; for, not only is a new and suggestive meaning thereby given to the various contrivances of the mechanism, but an insight into all the significance of the law itself is gained which can be acquired only by observing practical applications.

To explicate theoretic principles, however, is not the only value of the experimental work of the course. If the student desires to go from college to the manufacturing world it is essential that he should be familiar with working machines, methods of shop management, and as much of the every day detail of the machinist's work as it is possible for him to acquire as a supplement to his higher training.

With so broad a field before him the student of Mechanical Engineering has little time to spare for general culture, and it is highly desirable that he should already have completed a course of which general cultivation has been the object, before taking up Mechanical Engineering. Many young men, however, find it impossible to spend the time requisite for such preliminary education, and in order to obviate the disadvantage arising from that fact, some general studies are introduced into the course, in order to make it as broad and comprehensive as is consistent with a thorough training in the direct line chosen.

ELEMENTARY MECHANICS.—In order to be fully prepared for the more technical studies of the "Mechanics of Machinery" and "Applied Mechanics" generally, a carefully selected course in the Elementary Principles of Mechanics is given during the winter session of the Sophomore year.

MECHANICS OF MACHINERY.—Theoretical technical instruction begins the third term, Sophomore year, with "Mechanics of Machinery."

The student is made familiar with machines of various forms, and pursues a systematic study of motion in relation to these machines, how it is constrained, distributed and conveyed. The formulas relative to force and motion herein developed are directly applied to machines in the mechanical shops.

GRAPHICAL STATICS OF MACHINERY.—In the study of Graphical Statics of Machinery the efficiency of machines is determined by graphical methods. This embodies methods of determining sliding, journal, chain, gear-wheel, and other kinds of friction, and how it is modified by the size and form of parts. The amount of power required to overcome the friction in the entire machine, or any part of it, may be thus ascertained.

The efficiency of a number of the machines in the machine shops is calculated by the students, by this method, and compared with results from the steam engine indicator.

DESCRIPTIVE GEOMETRY.—Descriptive Geometry also begins in the third session of the Sophomore year, the practicum in drawing being devoted to it. Here, also, theory and practice are united, giving the students so thorough a training in graphical expression of ideas and principles (the language of the industries) that he may be able to write, read and even think of it.

PHYSICS.—Physics is begun in the first session, Junior year, and is carried through the year. Mechanics, Heat, Electricity, Light and Sound are all given due importance, special attention being given to Heat and Electricity as being of direct value in the subsequent work of the Mechanical Engineer.

APPLIED MECHANICS.—A course in Applied Mechanics is given during the Junior year, including Statics, Kinematics, Kinetics and Dynamics of Solids and Fluids.

VALVE GEAR AND LINK MOTION.—Following an elementary work on the steam engine, a theoretic and practical study of valve gear and link motion is taken up during the Junior year. The mathematical equations involved are applied to sectional working models of various types, a method which at the same time helps to elucidate the abstract formula and gives to it a practical value.

A thorough investigation of the various kinds of valves and link motions occurring in different types of engines, pumps and other machinery is part of the work done under this head.

MATERIALS OF ENGINEERING.—A prominent place in the curriculum of the Junior year is given to work upon Materials of Engineering. Special attention is paid to the manufacture and composition of iron and steel, not omitting, however, due consideration of other metals. The relative strength of materials is dealt with, and their strength and durability as affected by conditions to which they may be subjected.

BOILERS.—In the text work upon boilers, besides a study of the general

construction as to strength and form, considerable attention is paid to the rules adopted by different manufacturers as to grate area, heating surface, etc.

Accurate experiments upon combustion, for which our boiler settings have been prepared, are made.

Injectors and feed pumps are included under this head, both in class room and laboratory work, tests being made to determine how near the efficiency may be brought to that attributed to them theoretically.

MACHINERY OF TRANSMISSION.—This branch, embodying a comprehensive mathematical discussion of formulas relative to transmission and distribution of power, arrangement, size and speed of shafts, and different forms of gearing, is given during the spring session of the Junior year.

THERMODYNAMICS.—The study of Thermodynamics of the steam engine begins in the first term, Senior year. After completing a rigid course in the theory, the equations deduced are applied by tests made on the steam engines of the shops. Knowing theoretically what results should be obtained in pounds of steam per horse power, under perfect conditions, the student now observes the actual results under our working conditions.

Indicator practice is carried on at the same time, and here again a theoretic course is supplemented by practical experience in taking and interpreting indicator cards. The load upon the engine is varied by means of an absorption dynamometer, requiring a corresponding variation in the computations made.

Observations of efficiency with different degrees of cut off are also made, and reduced to terms of pounds steam, per hour, per horse power.

Comparsion of tabulated tests made upon actual machines now in use are made.

LUBRICANTS.—During the first term of the Senior year a course of ten lectures is given on Lubricants. Attention is paid to the character and composition of the various kinds, to the varying efficiency of each upon different materials and to the effect produced by varying conditions, such as pressure, velocity, temperature, and the like. Careful tests of oils and other lubricants from different manufacturers are made upon an oil-testing machine. The co-efficient of friction resulting from the use of a given lubricant under given conditions is thus determined.

HEATING AND VENTILATION.—A course of sixteen lectures is given on this subject. Different methods of heating and ventilation are investigated with a view to determining their efficiency and economy. The matter of favorable sanitary conditions as affected by heat and ventilation is given careful consideration. An excellent opportunity for observation and experiment with reference to steam heating is afforded by the large steam plant which heats all the College buildings, different methods of heating being employed in the different buildings.

MACHINE DESIGN.—This course has been somewhat extended. It begins in the winter session of the Junior year. Students are required to design parts of large mechanism, or complete small machines, with a view to constructing the same in their shop work. For the Senior year the course is so arranged as to embrace, during the fall session, hoisting and pumping machinery; during the winter session, ventilating and transporting machinery; and, during the spring session, mining machinery. A full knowledge of the design of steam engines is also necessarily included. Some preparation for this branch of work is made in the course in drawing, given to the Freshman Class, where machine design formulas, without deduction, are frequently used for the construction of small parts of mechanism.

HYDRAULIC MOTORS.—A course of lectures upon Hydraulic Motors is given during the third term, Senior year. This course makes application of the principles of Dynamics of Fluids to various Turbines and other water wheels in general use.

ELECTRICAL MACHINERY.—Electrical machinery, now so widely used for conveying and distributing power, is given three hours a week during the same session.

PURE MATHEMATICS.—The pure mathematics of this course includes Higher Algebra; Geometry, Plane and Solid; Trigonometry, Plane and Spherical; Analytical Geometry; Calculus, Differential and Integral; Differential Equations and Quaternions.

POLITICAL SCIENCE.—Political Economy, Constitutional Law, and International Law are part of the Senior work, as it is believed that the training acquired from these subjects not only broadens the student's general education, but may be of direct use to him professionally.

MODERN LANGUAGE.—One modern language is required in order to facilitate advanced research in the literature of Mechanical Engineering.

DRAWING.—Drawing begins in the Freshman year and is continued throughout the four years. The elementary course includes geometric drawing, lettering, drawing from the flat, shading, projections, sketching machines and drawing to scale from these sketches, and making detail and sectional drawings. This preliminary work is followed by designing as indicated in connection with the text-book work.

SHOP WORK.—A systematic course of shop work, including wood and iron, is begun in the Freshman year. The student thus gains facility in the handling of the tools and materials which enter into the construction of machines, and becomes acquainted with methods of shop work early in his course. After the elementary work of the shop has been completed, each class is required to build a complete machine. The classes of 1890 and 1891 built a sixteen-horse-power engine with automatic Cut Off.

THESES.—Theses based upon data derived from a course of experiments in a practical line of investigation are required during the Junior and Senior years, one each term. The student is here afforded an opportunity to apply his training in various lines of work to original research.

EXCURSIONS.—Excursions are occasionally made in order that the students may observe running machinery, methods of carrying and distributing power, arrangement of shafting, and manufacturing processes. The large works at Altoona, Harrisburg, Pittsburgh and elsewhere, are conveniently accessible for this purpose.

12. MILITARY DEPARTMENT.

This department is in charge of an officer of the regular army, detailed by the War Department, as Professor of Military Science and Tactics.

Instruction is both theoretical and practical. Practical during the Fall and Spring sessions, and theoretical during the Winter session.

Practical instruction includes instruction in—

INFANTRY.—School of the soldier, company and battalion, with ceremonies of guard-mounting, dress-parade, reviews and inspections.

CAVALRY.—School of the soldier dismounted—sabre exercise.

ARTILLERY.—Manual of the piece and service of the foot battery.

Considerable attention is paid to target practice, the College having a good range, and ammunition being furnished by the General Government. Students are taught to estimate distances by sight under varying conditions.

The manufacture of ammunition is taught by the use of reloading tools, cartridges fired on the range being reloaded when needed. Several drills are devoted to military signaling, and students taught the transmission of messages at as great distances as the surrounding country will admit.

Theoretical instruction is confined to one term, and is by recitations and lectures. The United States Infantry Drill Regulations is used as a text-book, and the assimilation of the other arms to the infantry is explained during the course, During the winter term, a course of lectures on military subjects is given, and students of classes not required to attend are allowed to be present when this does not interfere with their other college work.

The National Government has furnished the College with two field pieces of modern pattern and one hundred and fifty new cadet rifles complete, similar in all respects to those used at the West Point Military Academy. A neat uniform has been adopted, the cost of which is not more than that of a good suit of civilian's clothes. While it is a proper and becoming uniform, it can be worn anywhere without being conspicuous. Many students prefer wearing the uniform while at the College, and there is, in reality, no necessity for any other suit.

No exemption from military drill is granted any male student except on account of conscientious scruples or physical disability. In the latter case, students are required to present a physician's certificate. The experience of the past shows that, unless a student is maimed or suffering from great physical weakness, the military drill is a benefit, and for weak constitutions better medicine than a physician's prescription. Students coming to the College with a physician's certificate have, in some cases, seen fit to attend the drill notwithstanding, and are believed to have been benefited by so doing. Students exempt from drill may be assigned other work occupying the same time. The new Drill Hall and Armory has been provided with an adequate supply of movable gymnastic apparatus, and furnishes greatly improved facilities for military and gymnastic exercises in bad weather.

The object of the military instruction is not only to comply with the laws of Congress, but to supply the State with a number of well-instructed young men, capable of rendering intelligent and effective service in case of war or domestic riots. By a recent law of the State, graduates of the College, under certain conditions, are entitled to appointment as brevet second lieutenants in the National Guard.

13. PHILOSOPHY.

HISTORY AND POLITICAL SCIENCE.—The foundation for the study of Political Science is laid in an outline study of General History during the Sophomore year. In the time that can be given to this subject, nothing more can be attempted than a general view of the most important nations, with special reference to their place in the development of civilization and their contributions to its progress. This general course occupies the first

two terms of the year, the third being given to the more detailed study of some one country or epoch. Later, a general grouping of the facts and forces of European civilization is presented, in connection with the use of Guizot's History as a text-book. The General History, of the Sophomore year, is required in all regular courses, being regarded as an indispensable element in every scheme of liberal education.

In the Winter session of the General Science course, the Juniors pursue the study of Constitutional History, with special reference to the growth of representative institutions and the development of the Constitutions of England and the United States. The same subject is resumed in the Senior year, more particular attention being then paid to the formation, adoption and operation of the Constitution of the United States and the Constitution of Pennsylvania. A large part of the time devoted to this subject is occupied with a consideration of those features of our constitutional policy which have had large influence upon the Nation, and upon its relation to other countries.

The Seniors in all the courses, have recitations in Political Economy during one session. The history and development of the science are presented, particularly as related to our own country; and, while no essential point is unnoticed, all partisan teaching is avoided. It is the aim of the instruction also to awaken the interest of the students in current discussions, and to aid them in the formation and expression of clear, sound and logical views. Points thus brought out are often made the subject of formal essays and written discussions. Walker's Political Economy is at present used as text-book, and, as books of reference, the works of Adam Smith (Rogers' edition), Mill, Fawcett, Cairnes, Carey and others.

International Law is taught to the Seniors of the General Courses in the third session of the year, and is presented in the same manner as the other studies of this department. Wheaton, Kent and Phillimore are the principal books of reference, with Woolsey's work as a text-book.

MORAL PHILOSOPHY.—The Seniors, in most of the courses, engage in the study of Theoretical and Practical Ethics in the Spring session. Current questions are freely discussed; and an effort is made to render the subject familiar, and of practical value to the student. Seeley's edition of Hickok's Moral Science is the text-book used, with frequent references to other works.

MENTAL PHILOSOPHY.—This is the subject of four recitations per week by the Juniors in the Spring session. The study embraces the history and field of the science, the analysis, classification and offices of the mental powers, the phenomena exhibited by the mind when variously affected, questions concerning the will, etc. Books of reference—Hickok, Bascom, Porter, Reid, Stewart, Hamilton, Ueberweg and others.

14. PHYSICS AND ELECTRICAL ENGINEERING.

This course is designed not only to furnish an extended and thorough training in the various branches of Physics, which are properly included in a complete college course, but to provide an advanced technical course for those who wish to become specialists in the field of Electrical Science, with its numerous and rapidly increasing applications in modern industries.

The leading studies of the course are Physics, especially theoretical and applied Electricity, Mathematics and such studies in Civil and Mechanical Engineering as are most important to the Electrical Engineer. German, French, Chemistry, Drawing and Shop-work are other subjects directly related to the technical purpose of the course. Studies in History, Constitutional Law, Political Economy, International Law and Mental Science are introduced in order to give a broader training.

The first and second years are the same as in the Civil and Mechanical Engineering Courses, except some laboratory work in physical measurements in the latter part of the Sophomore year.

In the Junior year, continuing Mathematics and Engineering studies, there is a course in Physics embracing the most important principles in dynamics, heat, magnetism, electricity, sound and light, with ten hours per week in the physical laboratory, principally devoted to electrical measurements and constructing electrical instruments.

In the Senior year, the Mathematical theory and the technical applications of electricity from the special work of the course, with laboratory practice in making apparatus, calibrating instruments and electrical testing; and, in the Spring session, the preparation of a Thesis on some subject in electrical science or art, which must show that the student is able to use his knowledge in the treatment of some scientific or practical problem.

The laboratory work of the student of Electrotechnics is designed to familiarize him with the various electrical and magnetic magnitudes, as current, resistance, potential, quantity, strength of pole, magnetic moment, inductance, etc., and both their C. G. S. and their practical units, as, ampere, ohm, volt, farad, henry, etc.; to give him practical knowledge of electrical and magnetic measurements; to make him practically acquainted with the principles, construction, care and use of the best instruments employed in electrical engineering, and to give him as much as possible of practice in those problems connected with dynamos, electric motors, distribution of currents, transmission of energy, photometry, etc., that will engage him in his actual electrotechnical work.

To young men who have considerable practical knowledge of electricity and its applications, and who have the necessary mathematical advancement, this course affords an opportunity to acquire, in a year devoted especially to the electrical work of the combined Junior and Senior classes,

an acquaintance with the principles of electrical science, and of electrical instruments and tests.

Also, graduates or advanced students of civil or mechanical engineering who have decided to prepare themselves for electrical work, could in one year, devoted exclusively to it, complete the purely electrotechnical work of this course.

Physics.—The study of physics, in all the full College courses, except that in Agriculture, extends through the Junior year, and comprises a thorough course in the fundamental principles of dynamics, heat, electricity and magnetism, sound and light, with laboratory work from two to five sessions in the different courses.

In the beginning, much attention is given to the principles of energy, force and motion, and their applications in sensible masses of matter. The laboratory work, at the same time, is in experimental dynamics, in order to make real in the conceptions of the student the physical magnitudes, their units and their measurements, and to verify the physical validity of a number of the most important of the principles analytically established, and thus give him confidence in the application of analysis to physical principles and problems.

Afterward each student performs a series of experiments in measurements, forces, motions, properties of matter, sound, light, heat, electricity and magnetism.

The more extended electrical studies and work of students in the Electrotechnic Course have been indicated above.

New Building.—In the new building for Physics and Chemistry, the part devoted to Physics has a front of eighty-four feet on different parallel lines, making the depth of part of it forty-four feet, and of part sixty-five feet. There are a well-lighted basement (mostly above ground line), first and second stories, and some valuable attic room.

In the basement are shops, battery room, gasometer room, clock room, store room, four small laboratories, a large dynamo-electric laboratory, photometric room and spectrometer room.

In the first story are the lecture room, apparatus room, library, office, four special laboratories and a general laboratory over the apparatus room.

In the second story are a large elementary laboratory, a small laboratory, apparatus room and assistant's room.

In the attic are photographic rooms, dark rooms for work in optics, and a general laboratory for sound and heat.

Relative position of rooms, availability of light, piers for instruments, and other details have received careful attention.

Text-Books and Laboratory Manuals.—Anthony and Brackett's Physics, Thompson's Dynamo-Electric Machinery, Ayrton's Practical Electricity, Gray's Theory of Electricity, Kapp's Electric Transmission of Energy, Maier's Electric Lighting, Glazebook and Shaw's Practical Physics, Stewart and Gee's Practical Physics, Pickering's Physical Manipulations, Kohlrauch's Physical Measurements, Kempe's Hand-Book of Electric Testing.

There are in the College Library, to which the students have daily access, several hundred volumes of Philosophical Transactions, Philosophical Magazines, British and American Encyclopedias, and works of German, French, English and American physicists. The best scientific periodicals are also to be found there.

SUMMARY.

The following statement will serve to show more concisely the ground covered by the several courses of instruction and the provison made for each:

1. Political Science, including History, Mental and Moral Science:—

   The President,
   Professor McKee,*
   Professor (Miss) McElwain.

2. Botany, Agriculture, Agricultural Chemistry, Chemistry, Horticulture and Zoology, with their several related branches:—

   Professor Buckhout,
   Professor Frear,
   Professor Pond,
   Professor Armsby,
   Professor Fernald,
   Professor Waters.

2. Botany, Agriculture, Agricultural Chemistry, Chemistry, Horticulture and Zoology, etc.—*Continued:*

   Mr. Butz,
   Mr. Caldwell,
   Mr. Tuttle.

3. Pure Mathematics:—

   Professor Jackson,
   Mr. Root.

4. Applied Mathematics, Civil Engineering, Electrical Engineering and Mechanical Engineering:—

   Professor Osmond,
   Professor Barnard,
   Professor Reber,
   Professor Pemberton,
   Mr. Downing,
   Mr. Beyer.

* Deceased, December 24, 1892.

5. Language and Literature, including English Literature, Rhetoric and the Latin, English, French, German and Spanish Languages:—

Professor McKee,*
Professor Davis,
Professor Kinnie,
Professor Sparks.

Besides these five groups of subjects which embrace nearly the entire range of instruction in the College Classes, may be mentioned three others which for various reasons should hardly be classified with the foregoing Departments.

6. The Ladies' Department, including Industrial Art and Design and Music:—

Miss McElwain,
Miss Willard,
Miss Redifer.

7. The Military Department:—

Lieutenant Silas A. Wolf, 4th U. S. Infantry.

8. The Preparatory Department:—

Professor Sparks,
Mr. Roop,
Mr. Thompson,
Mr. Downing,
Miss Redifer.

* Deceased, December 24, 1892.

GENERAL STATEMENTS.

1. RELIGIOUS EXERCISES AND LECTURES.

The Faculty and Students meet in the Chapel every morning, except Saturday, for religious exercises, conducted by members of the Faculty. At 3 p. m., every Sunday, preaching services are regularly conducted by clergymen of the vicinity. Attendance on chapel exercises and on preaching is required of all students, except such as regularly attend elsewhere with their parents or guardians. In the evening students are at liberty to attend service in the churches in the village.

2. COMPOSITION AND PUBLIC SPEAKING.

Students in all the College courses of study are required to engage in public Rhetorical Exercises. These consist of declamations during the Freshman and Sophomore years, and essays and orations during the Junior and Senior years. All original productions are submitted to the Professor of English and Rhetoric for corrections and suggestions, and on each exercise, prior to its presentation in public, the student receives instruction and drill in the art of delivery.

In addition to these public exercises, each of the two lower College classes constitute an essay division, and its members, twice a term, prepare essays upon subjects previously assigned. Junior and Senior students, prepare, in place of these essays, dissertations or themes on some assigned subject or work in the Sciences.

3. MUSIC.

Facilities are afforded, both to beginners and to advanced pupils, for instruction on the piano and the organ and in vocal music. This instruction is individual, and not by classes. Instruments for the use of pupils are provided by the College. For charges for instruction in instrumental music and use of instruments, see page 46. Students are also allowed to join a voluntary choral class free of charge.

4. STUDENTS' SOCIETIES.

There are two Literary Societies actively maintained by the students, named, respectively, the Cresson and the Washington. Each has a commodious hall, handsomely fitted up and furnished, in which weekly meetings are held. Besides these, a Young Men's Christian Association is doing earnest and effective work.

5. LIBRARIES AND READING-ROOMS.

The Library belonging to the College has about seven thousand volumes, embracing scientific and technical works, memoirs, scientific essays, agricultural and educational works, etc., in English, French and German, forming the foundation of a good Scientific Library. Four or five hundred volumes per year are being added.

The Reading-room, in connection with the College Library, offers to Faculty and Students an ample and well-selected list of scientific and other periodicals.

Donations of books and periodicals are invited from friends of the Institution, publishers and authors.

Each of the two Students' Literary Societies has a good Library of standard and miscellaneous works, and a reading-room supplied with the principal literary periodicals and newspapers of the day.

6. DISCIPLINE.

The discipline of the College is intended to be strict, but reasonable and considerate. It assumes that students come here, not to spend their time in idleness, but to prepare themselves for useful and honorable careers in life. The aim of the Faculty is to lead students to cultivate habits of steady application, self-control, a high sense of honor, truthfulness, and an interest in maintaining the purity of the moral atmosphere of the institution. Those who are not disposed to support heartily a discipline of this kind ARE URGED NOT TO APPLY FOR ADMISSION. Students whose influence, after fair trial, is found to be injurious to good scholarship or good morals will be removed from the Institution.

7. EXAMINATIONS.

Examinations in all subjects are, as a general rule, conducted in writing; partly as a means of testing the student's knowledge, and partly as an important means of training in the habit of careful, accurate and rapid statement. No student can advance to full standing in a next higher grade, until all such examinations have been satisfactorily passed.

8. GRADUATE INSTRUCTION.

Persons who have been graduated in one of the Regular Courses here, or an equivalent course elsewhere, are permitted to enter the College for instruction in an advanced course, consisting of such studies as may, in each case, be approved by the Faculty.

9. DEGREES.

The Degree of Bachelor of Science is conferred upon graduates of the four years' Courses. The diploma given to graduates of the Technical Courses contains mention, also, of the special line of technical work pursued.

The Degree of Master of Arts or Master of Science is conferred upon graduates of the State College, of at least three years' standing, who are known to have been systematically pursuing scientific, literary, or professional studies, and upon graduates of this or other institutions who have, satisfactorily to the Faculty, studied at least one year in the Graduate Courses.

Higher degrees, such as C. E., Ph. D., D. S., etc., are conferred only at the end of prescribed courses of advanced study, or in recognition of high professional attainments. The conditions on which such degrees are granted may be learned on application to the Secretary of the Faculty.

10. EXPENSES.

No charge whatever is made for Tuition, except for special instruction in music, for which see page 44.

INCIDENTALS.—Each student, whether from a distance or a resident in the neighborhood, is required to pay $17 a year for the heating, lighting, and care of the recitation and other public rooms, viz: $7 for the Fall session, $5 for the Winter, and $5 for the Spring. This is the only charge (except a small laboratory fee in some of the courses) made to students who do not occupy College rooms.

ROOM RENT.—Preparatory students are required to occupy rooms in the college dormitories; but college students may occupy rooms elsewhere, subject in all cases to the approval of the Faculty. To those who rent rooms in the college dormitories, the uniform charge is as follows:

		Fall Session.	Winter Session.	Spring Session.
1. Students not renting a College room, ...	Incidentals,	$7 00	$5 00	$5 00
2. Students renting a College room—(*Rooming alone*),	Incidentals,	$7 00	$5 00	$5 00
	Room Rent,	15 00	18 00	12 00
	Light,	3 50	3 50	2 50
	Key Deposit,	50	50	50
		$26 00	$27 00	$20 00
3. Students renting a College room—(*With room-mate,*)	Incidentals,	$7 00	$5 00	$5 00
	Room Rent,	11 00	14 00	8 00
	Light,	1 75	1 75	1 25
	Key Deposit,	50	50	50
		$20 25	$21 25	$14 75
4. Senatorial Students—(*Rooming alone*), . .	Room Rent,	$4 00	$4 00	$4 00
	Light,	3 50	3 50	2 50
	Key Deposit,	50	50	50
		$8 00	$8 00	$7 00
5. Senatorial Students—(*With room-mate*), ...	Light,	$1 75	$1 75	$1 25
	Key Deposit,	50	50	50
		$2 25	$2 25	$1 75

By a resolution of the Board of Trustees, each student, before he is permitted to enter his name upon the College roll, is required to pay an amount sufficient to cover all his College bills for the current session, besides a special deposit of $5 as a security against general damages, or, in case he cannot pay immediately, to give a note with sufficient security, for the payment at some future time, unless excused by the Executive Committee.

LABORATORY EXPENSES.—Students during the time they are engaged in laboratories, pay a small charge for their outfit; also, for apparatus destroyed and material consumed by them. Such charges, at present, are as follows:

Botany, per term,	$1 00
Zoology, per term,	2 00
Carpentry, per course,	2 50
Wood-work, per course,	2 50
Forging, per course,	3 50
Chipping and filing, per course,	3 00
Machine work in iron,	4 00
Chemistry, per term,	10 00
Physics, per term,	1 00
Physics and Electrical Engineering, per term,	2 00

In the chemistry practicum, accounts are kept with individual students, who are liable for any excess above the amount paid in advance.

BOARD.—The College does not maintain a boarding-hall, and most students depend upon the boarding-houses in the vicinity, the regular charge being $3 per week. The College provides facilities for Boarding Clubs which supply their members with good board at from $2.50 to $3.00, according to the varying wishes of the club. The College year is thirty-eight weeks.

FURNITURE.—The furniture provided for students who room in the College dormitories consists of a bedstead, mattress, table, washstand and chair. The student provides all other articles, including pillow, bedding, washbowl, pitcher, mirror, etc. In the Ladies' Cottage everything is provided except bed clothing, towels and napkins.

UNIFORM.—Each cadet is required to provide himself with a uniform, the coat and cap of dark blue cloth, the pantaloons of light blue. The entire suit is exceedingly neat and serviceable, and may be worn on any occasion. Measures are taken at the College, and orders filled by some approved maker. The uniform for cadets cost, at present, $14.65, $18.55 or $21.05, according to the quality selected; and must be paid for when ordered.

MUSIC.—Instruction in vocal music or on the piano or cabinet organ will be given at the rate of $10 for twenty lessons, and $3 per quarter (two hours daily) for use of instrument in practicing. Instruction in Harmony, $5 for twenty lessons.

The charge to pupils not in regular standing in the College is a matter of private arrangement with the Instructor. The present charge in such cases is $15 for twenty lessons.

WASHING is at the rate of fifty cents per dozen.

BOOKS AND STATIONERY can be procured at stores and at the College, at Philadelphia retail prices.

DAMAGES.—Persons causing special damages will be required to pay for the same. General damages will be assessed upon the body of students.

All remittances should be made to the President, State College, Centre county, Pa., by draft or by money order drawn on State College postoffice.

11. FREE (SENATORIAL) SCHOLARSHIPS.

The Trustees have established fifty scholarships, one for each Senatorial district in the State, entitling the holder to *exemption from all College charges (except for lights and for material used in the Laboratories)*, in any of the REGULAR FOUR YEARS' COLLEGE COURSES. The scholar, male or female, is to be appointed by the Senator of the district, after a com-

petitive examination in the studies required for admission to the Freshman class (General Science Course), or to the third year of the Course in Mechanic Arts. No person is eligible as a candidate who has previously been admitted to any College class.

The holder of the scholarship is admitted to the privileges of any of the REGULAR COLLEGE COURSES (*but not the Preparatory or Special courses*) free of the ordinary charges for incidentals, room rent, fuel and furniture. This allowance amounts, at the present rate of charges, to $50 a year, and is continued the entire College course, provided that both conduct and class standing be satisfactory to the Faculty. A vacancy may be filled after the opening of the College year, if the appointee's attainments do not fall below the standard of the class at the time of application for admission. For information as to vacancies, time and place of examination, etc., candidates for scholarships should apply to their Senator (in whose hands the details of appointment have been placed by the College) or to the President of the College.

ADMISSION TO COLLEGE.

Examinations for admission are held on Tuesday of Commencement week, and on the day before the opening of the Fall session, the dates being, this year (1892), the *28th of June and the 13th of September, respectively. It is desirable, on every account, that candidates be present on one or both of these days. Those who cannot do so will be examined at any time during the year, and admitted to the class for which they are found prepared.

In all cases, the applicant for admission must present evidences of good character, and, when coming from another institution, of honorable dismissal.

For admission to the Freshman class, candidates (of either sex) must be at least fifteen years of age, and pass a satisfactory examination in the following subjects:

1. FOR THE COURSES IN GENERAL SCIENCE, AGRICULTURE, CIVIL AND MECHANICAL ENGINEERING AND PHYSICS AND ELECTRICAL ENGINEERING:

English Grammar; Arithmetic; Geography, both Descriptive and Physical; United States History; Physiology; Higher Algebra, through Quadratics and Progressions; Wentworth's Geometry, four books; and the elements of Physics, as much as is contained in Avery, Rolfe and Gillet, or Gage.

2. FOR THE LATIN-SCIENTIFIC COURSE: the same as above, with the addition of four books of Cæsar and four orations of Cicero.

3. FOR THE SPECIAL COURSE IN CHEMISTRY: applicants will be admitted without examination, except in Mathematics.

In that branch, at present, the applicant must be fully prepared to pass examination in Arithmetic, including the Metric system, and the first two hundred pages of Newcomb's Elementary Algebra, or an equivalent; but in order to derive the greatest advantage from the Course, it is recommended that students be so far advanced as to have completed the Mathematical Studies of the Freshman year.

4. FOR THE COURSE IN MECHANIC ARTS: the same as for admission to the Preparatory Department.

5. FOR THE LADIES' COURSE IN LITERATURE: the same as for the General Science Course.

6. FOR PARTIAL (OR ELECTIVE) COURSES, applicants must at least be prepared to enter the Freshman class, General Science Course.

*The date of the June examination is likely to be changed to an earlier day.

IN LIEU OF EXAMINATION.

1. GRADUATES OF STATE NORMAL SCHOOLS and of a SELECT LIST OF HIGH SCHOOLS AND ACADEMIES in Pennsylvania, whose standard of requirements has been ascertained to be satisfactory, will be admitted to the Freshman class without further examination in studies which, as shown by their diploma or certificate, they have successfully completed in such institution. *Such certificates must show specifically the amount of work done in each subject.*

2. THE HOLDERS OF SENATORIAL SCHOLARSHIPS are admitted on the certificate of the Examining Committees in the several Senatorial districts.

ADVANCED STANDING.

APPLICANTS FOR ADVANCED STANDING, in any course, must pass a further examination in the studies which have been pursued by the class for which they are candidates.

THE FULL COURSES OF INSTRUCTION occupy four years, with three terms, or sessions, in each year. The following Schedules of Studies indicate the amount of work required in the several Courses, or the equivalent, which will be accepted from candidates for advanced standing.

Specimens of Examination Papers will be furnished on application.

SCHEDULES OF COURSES.

[Figures after subjects indicate hours of recitation or practice per week; *Italics*, titles of Text Books.]

I. GENERAL SCIENCE COURSE.

FRESHMAN CLASS.

FALL SESSION.—Algebra, *Newcomb's College* and *Wentworth's* (4), Geometry, *Wentworth's Plane and Solid* (2), French or German (5), or each (3), English, *Genung's Hand-Book of Rhetorical Analysis* (4).
Practicums.—Drawing (4), English (4).

WINTER SESSION.—Trigonometry, *Chauvenet's Plane and Spherical* (3), Geometry, *Wentworth's Plane and Solid* (3), Rhetoric, *Genung's Practical* (4), French or German (5), or each (3).
Practicums.—Drawing (2), Mechanic Arts (6).

SPRING SESSION.—Trignometry, *Chauvenet's* (5), Old English, *Morris'* (3), German or French (5), or each (3), *U. S. Infantry Drill Regulations* (2).
Practicums.—First half of session—Wood Turning (4). Second half of session—Horticulture (4). Drawing all the session (4).

SOPHOMORE CLASS.

FALL SESSION.—Analytical Geometry, *Wood's* (4), Chemistry, *Lectures on the Non-Metals* and *Harris' Lecture Notes on General Chemistry* (5), History, *Fisher's Outlines* (3), French or German (2), Surveying, *Bellows' and Hodgman's Manual* (1).
Practicums.—Surveying (4), Chemistry (4).

WINTER SESSION.—Analytical Geometry, *Woods'* (3), Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualitative Analysis* (3), German, *Hodges' Scientific German*, or French (2), History, *Fisher's Outlines* (4), General Biology, *Lectures* (3).
Practicums.—Chemistry (8), Biology (2).

SPRING SESSION.—Chemistry, *Same as Winter Session* (3), General Biology (4), History, *Special Treatise* (3), Differential Calculus,* *Taylor's* (4), French or German (2).
Practicums.—Chemistry (6), General Biology (4).

JUNIOR CLASS.

FALL SESSION.—Physics, *Anthony and Brackett's* (4), French or German (4), Logic, *Day's Elements* (3), General Botany, *Lectures* (4).
Practicums.—Dynamics (4), Botany (6).

* NOTE.—For the Differential Calculus of this Session, students preparing for the course in Biology may substitute seven hours of practicum in Chemistry.

WINTER SESSION.—Physics, *Anthony and Brackett's* (4), French or German, *Selections* (3), Cryptogamic Botany (4), Constitutional History, *Creasy's English Constitution* (4).
Practicums.—Physics (4), Botany (6).
SPRING SESSION.—Physics, *Anthony and Brackett's* (4), Mineralogy, *Lectures* (1), Mental Science, *Seeley's Hickok* (4), English Literature, *Day's Introduction* (4), Zoology, *Lectures* (2).
Practicums.—Physics (4), Mineralogy (6).

SENIOR CLASS.

FALL SESSION.—Zoology (Entomology), *Lectures* (4), Geology, *Dana's* (4), Political Economy, *Walker's* (4), English Literature, *Readings* (3).
Practicums.—Zoology (6), Geology (4).
WINTER SESSION.—Geology, *Dana's* (2), Constitutional Law, *Cooley's General Principles* (4), Astronomy, *Young's General* (3), History of Civilization, *Guizot's* (4), Zoology (Vertebrate), *Lectures* (3).
Practicums.—Geology (6), Zoology (4).
SPRING SESSION.—International Law, *Woolsey's* (4), Astronomy, *Young's General* (3), Moral Science, *Seeley's Hickok* (4), History of English Literature, *Gilman's*, or Forestry (3).
Practicums.—Original work—elective (5), Graduation Thesis.

2. LATIN-SCIENTIFIC COURSE.

[The text-books, except Latin, are the same as for the corresponding sessions in the General Science Course.]

FRESHMAN CLASS.

FALL SESSION.—Algebra (4), Geometry (2), German (5), Latin, *Sallust's Catiline, Allen and Greenough's* (4).
Practicums.—Drawing (4), English (4).
WINTER SESSION.—Trigonometry (3), Geometry (3), Latin, *Virgil's Æneid, Greenough's* (5), German (4).
Practicums.—Drawing (2), Mechanic Arts (6).
SPRING SESSION.—Trigonometry (5), German (2), Latin, *Cicero De Officiis, Chase and Stuart's* (4), Old English (3), U. S. Infantry Drill Regulations (2).
Practicums.—First half of session—Wood Turning (4). Second half of session—Horticulture (4), Drawing all the session (4).

SOPHOMORE CLASS.

FALL SESSION.—Analytical Geometry (4), Surveying (1), Chemistry (5), Latin, *Horace's Satires and Epistles* (2), History (3).
Practicums.—Surveying (4), Chemistry (4).
WINTER SESSION.—General Biology (3), Chemistry (3), History (4), Latin, *Tacitus, Champlin's Selections* (3), French (2).
Practicums.—Chemistry (8), General Biology (2).
SPRING SESSION.—Chemistry (3), General Biology (4), Differential Calculus* (4), History (3), French (1).
Practicums.—Chemistry (6), General Biology (4).

[The studies of the last two years in this course are the same as in the General Science Course.]

* See note on preceding page.

3. COURSE IN AGRICULTURE.

FRESHMAN.

FALL SESSION.—Rural Economy, *Lectures* (3), Chemistry, *Lectures on the Non-Metals* and *Harris' Lecture Notes on General Chemistry* (5), English, *Genung's Hand-Book of Rhetorical Analysis* (4), Geometry, *Wentworth's Plane and Solid* (2).

Practicums.—Agriculture (6), Drawing, Geometrical and Projection (4), Chemistry (2).

WINTER SESSION.—Rural Law, *Haigh's Manual of Farm Law* (2), Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualitative Analysis* (3), Geometry and Elements of Conic Sections, *Wentworth's Plane and Solid Geometry* (3), Trigonometry, *Chauvenet's Plane and Spherical Trigonometry* (3), Rhetoric, *Genung's Practical* (4).

Practicums.—Agriculture (4), Chemistry (8).

SPRING SESSION.—Farm Appliances and Buildings, *Lectures* and *Thomas' Farm Implements* (3), Agricultural Chemistry, *Lectures* and *Johnson's How Crops Grow* (4), Chemistry, as in the Winter Session (3), English (3), U. S. Infantry Drill Regulations (2).

Practicums.—Agriculture (2), Agricultural Chemistry (2), Chemistry (6).

SOPHOMORE YEAR.

FALL SESSION.—Agricultural Chemistry, *Lectures* and *Johnson's How Crops Feed* (5), Surveying, *Bellows and Hodgman's Manual* (1), History, *Fisher's Outlines* (3), German (5).

Practicums.—Agricultural Chemistry (8), Surveying (4).

WINTER SESSION.—Agricultural Chemistry, *Lectures* (3), General Biology (3), History, *Fisher's Outlines* (4), German, (5).

Practicums —Agricultural Chemistry (2), Biology (2), Mechanic Arts (6).

SPRING SESSION.—Meteorology, *Abercromby's Weather* (3), General Biology, *Lectures* (4), History, *Special Treatise* (3), German, (5).

Practicums.—Meteorology (2), Agriculture (4), Biology (4).

JUNIOR YEAR.

FALL SESSION.—Stock Feeding, *Lectures* and *Armsby's Cattle Feeding* (5), Soils, *Lectures* and *Elliotts Practical Farm Drainage* (2), General Botany, *Lectures* (4), Descriptive Physics, *Ganot's* (4).

Practicums.—Soils (4), Botany (6).

WINTER SESSION.—Animal Husbandry, *Saunder's Horse-Breeding* and *Curtis' Horse, Cattle, Sheep and Swine* (5), Cryptogamic Botany, *Lectures* (4), Comparative Anatomy, *Lectures* (2), Descriptive Physics, *Ganot's* (4).

Practicums.—Cryptogamic Botany (6), Comparative Anatomy (4).

SPRING SESSION.—Dairy Husbandry, *Lectures* and *Stewart's Dairyman's Manual* (5), Economic Botany, *Lectures* (4), Horticulture, *Lectures* (5).

Practicums.—Dairying (6), Horticulture (6).

SENIOR YEAR.

FALL SESSION.— Horticulture, *Lectures* (3), Entomology, *Lectures* (4), Geology, *Dana's* (4), Political Economy, *Walker's* (4).
Practicums.—Horticulture (6), Entomology (4).
WINTER SESSION.—Farm Crops, *Lectures* (5), Agricultural Chemistry, Horticulture or Veterinary Science (4), Geology, *Dana's* (2), Constitutional Law, *Cooley's General Principles* (4).
Practicums.—Agricultural Chemistry, Horticulture or Veterinary Science (4), Thesis (6).
SPRING SESSION.—History of Agriculture, *Lectures* (3), Agricultural Chemistry, Horticulture or Veterinary Science (5), Forestry (3), International Law, *Woolsey's* (4).
Practicums.—Agricultural Chemistry, Horticulture or Veterinary Science (4), Thesis (6).

4. SHORT COURSE IN AGRICULTURE.

[Students admitted without examination. Required age fifteen years.]

Agriculture—60 lectures. Live Stock, Breeds, Breeding and Management, Dairying, Farm Crops, Road Making.
Practicums in Feeding, Dairying and Farm Economy.
Agricultural Science—60 lectures. The Agriculturally Important Chemical Elements, Principles of Plant Growth, Fertilizers, Principles and Practice of Feeding, Feeding Stuffs and Dairy Products.
Practicum in Milk Testing (one afternoon per week).
Horticulture and Economic Entomology—60 lectures. Cultivation of Vegetables and Small Fruits, Floriculture, Forestry, Seed Growing, Cross Fertilization, Habits and Classification of Insects, Useful and Injurious.
Practicums in Seed Testing, Management of Hot Beds and Green Houses, Cross Fertilization.
Veterinary Science—24 lectures.
Common Diseases and Accidents.
(Clinic once a week.)
Students to elect Practicum in Agriculture and Horticulture.

5. COURSE IN BIOLOGY.

[The studies of the first two years in this Course are the same as in the General Science or the Latin-Scientific Course]

JUNIOR CLASS.

FALL SESSION.—Physics (4), General Botany (4), Human Anatomy (5)
Practicums.—Dynamics (4), Botany (6), Human Anatomy (4).
WINTER SESSION. — Physics, (4), Botany, Cryptogamic (4), Advanced Physiology, *Lectures* (3), Histology, *Lectures* (4).
Practicums.—Physics (4), Botany (6).
SPRING SESSION.—Physics (4), Mineralogy (1), Mental Science (4), Zoology, *Lectures* (2), Botany, Phænogamic (4).
Practicums.—Physics (4), Mineralogy (6).

SENIOR CLASS.

FALL SESSION.—Zoology, Entomology, *Lectures* (4), Geology (4), Political Economy (4), Plant Physiology (3).
Practicums.—Zoology (6), Geology (4).
WINTER SESSION.—Geology (2), Constitutional Law (4), Embryology, *Lectures* (3), Zoology, Vertebrate, *Lectures* (3).
Practicums.—Geology (6), Zoology (4), Embryology (6).
SPRING SESSION.—International Law (4), Moral Science (4), Forestry (3), Theories of Biology, *Lectures* (4).
Practicums.—Embryology (4), Original work (6), Gradution Thesis.

6. COURSE IN CHEMISTRY.

[The studies of the first two years in this Course are the same as in the General Science or the Latin-Scientific Course.]

JUNIOR CLASS.

FALL SESSION.—Theoretical Chemistry, *Remsen's* (3), Quantitative Analysis (1), Physics, *Anthony and Brackett's* (4) Integral Calculus, *Taylor's* (3).
Practicums.—Dynamics (4), Chemistry, Quantitative Determinations, Gravimetric and Volumetric (14).
WINTER SESSION.—Theoretical Chemistry, *Remsen's*, and Organic Chemistry, *Lectures* (3), Quantitative Analysis (1), Physics, *Anthony and Brackett's* (4).
Practicums.—Physics (4), Chemistry, Quantitative Separations and Complete Analysis of Alloys, Minerals and Commercial Products (20).
SPRING SESSION.—Organic Chemistry, *Lectures* (3), Physics, *Anthony and Brackett's* (4), Mineralogy, *Lectures* (1), Mental Science, *Seelye's Hickok* (4).
Practicums.—Physics (4), Chemistry, Work of winter session continued (8), Mineralogy (6).

SENIOR CLASS.

FALL SESSION.—Chemical Technology, *Conferences* (4), Geology, *Dana's* (4), Political Economy, *Walker's* (4).
Practicum.—Chemistry: Analysis of Iron and Steel and Organic Preparations (16).
WINTER SESSION.—Chemistry, *Special Topics* (3), Plant Chemistry, *Lectures* (3), Constitutional Law, *Cooley's General Principles* (4).
Practicum.—Chemistry: Organic Preparations continued and Organic Analysis, including Analysis of Water, Urinary Analysis and Toxicology (20).
SPRING SESSION.—Chemistry, *Special Topics* (3), Animal Chemistry, *Lectures* (3), International Law, *Woolsey's* (4).
Practicum.—Chemistry: Ultimate Analysis and Sanitary Chemistry (20), Graduation Thesis.

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7. SHORT COURSE IN CHEMISTRY.

FIRST YEAR.

FALL SESSION.—Chemistry, *Lectures on the Non-Metals* and *Harris' Lecture Notes on General Chemistry* (4), Mathematics (6), German, (5).
Practicum.—Laboratory Practice.
WINTER SESSION.—Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualtitative Analysis* (4), Mathematics (6), German (5).
Practicum.—Qualitative Analysis.
SPRING SESSION.—Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualitative Analysis* (3), Mineralogy, *Lectures* (1), German, (5), Mathematics (5).
Practicums.—Qualitative Analysis and Determinative Mineralogy.

SECOND YEAR.

FALL SESSION.—German, *Historical Selections* (2), Mathematics (4), Chemistry, *Remsen's Theoretical* (3), Quantitative Analysis, *Fresenius'* (3).
Practicum.—Quantitative Analysis.
WINTER SESSION.—German, *Hodges' Scientific German* (2), Mathematics (4), Chemistry, *Remsen's Theoretical* (3), Quantitative Analysis, *Fresenius'* (1).
Practicum.—Quantitative Analysis.
SPRING SESSION.—Mathematics (4), Chemistry, Chemical Technology, *Lectures* (3).
Practicum.—Quantitative Analysis, Thesis.

8. COURSE IN CIVIL ENGINEERING.

FRESHMAN CLASS.

FALL SESSION.—Algebra, *Newcomb's College* and *Wentworth's* (4), Geometry, *Wentworth's Plane and Solid* (2), German or French (5), English, *Genung's Hand-Book of Rhetorical Analysis* (4).
Practicums.—Drawing, Geometrical and Projection (4), Carpentry (4).

WINTER SESSION.—Trigonometry, *Chauvenet's Plane and Spherical* (3), Geometry, *Wentworth's Plane and Solid* (3), Rhetoric, *Genung's Practical* (4),German or French (5).
Practicums.—Drawing (2), Metal Work (6).

SPRING SESSION.—Trigonometry, *Chauvenet's* (5), Old English, *Morris'* (3), German or French (5), United States Infantry Drill Regulations (2).
Practicums.—Drawing (4), Metal Work (4).

SOPHOMORE CLASS.

FALL SESSION.—Analytical Geometry, *Wood's* (4), Chemistry, *Lectures on the Non-Metals* and *Harris' Lecture Notes on General Chemistry* (5), History, *Fisher's Outlines* (3), German or French (2), Surveying, *Bellows and Hodgman's* (1).
Practicums.—Surveying (4), Chemistry (4).

WINTER SESSION.—Analytical Geometry, *Wood's* (3), Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualitative Analysis* (3), History, *Fisher's Outlines* (4), Elementary Mechanics, *Wood's* (3), German, *Hodges' Scientific German*, or French (2).
Practicums.—Metal Work (2), Chemistry (8).

SPRING SESSION.—History, *Special Treatise* (3), Differential Calculus, *Taylor's* (4), Descriptive Geometry (Lines and Planes, Single and Double, Curved and Warped surfaces) *Church's* (4), Mechanics of Machinery, *Kennedy's* (4).
Practicums.—Descriptive Geometry (4), Chemistry (6)

JUNIOR CLASS.

FALL SESSION.—Applied Mechanics (Strength of Materials), *Church's* (5), Descriptive Geometry (Spherical Projections, Perspective and Maps), *Church's* (4), Integral Calculus, *Taylor's* (3), Higher Surveying (Topography), *Johnson's* (3).
Practicums.—Draughting (4), Topography and Geodesy (6).

WINTER SESSION.—Applied Mechanics (Fluids), *Church's* (4), Physics, *Anthony and Brackett's* (4), Higher Surveying (Practical Astronomy and Geodesy), *Johnson's* and *Lectures* (3), Engineering Structures (Bridges and Roofs), *Du Bois'* (4).
Practicums.—Topographical and Engineering Drawing (6), Physical Measurements (4).

SPRING SESSION.—Physics, *Anthony and Brackett's* (4), Least Squares, *Merriman's* (3), Materials of Construction, *Thurston's* (3), Designing (Bridges and Arches), *Du Bois'* (3), Economics of Roads and Railroads, *Lectures* (2).
Practicums.—Draughting (4), Photographic Surveying and Special Problems (6).

SENIOR CLASS.

FALL SESSION.—Engineering Structures (Piers, Dams and Foundations), *Baker's* (3), Hydraulic Engineering, *Fanning's* (4), Geology, *Dana's* (4), Political Economy, *Walker's* (4).
Practicums.—Railroad Surveying (6), Geodesy (4).
WINTER SESSION.—Designing, *Lectures* (4), Steam and Steam Engines, *Holmes'* (4), Constitutional Law, *Cooley's General Principles* (4), Astronomy, *Young's General* (3).
Practicums.—Draughting (6), Model Construction and Engine and Pump Test (4).
SPRING SESSION.—Sewerage and Drainage, *Staley and Pearsons'* (3), Electric Light and Power (3), Lectures on Civil Engineering Topics (2), Hydraulic Motors, *Bodmer's* (3), International Law, *Woolsey's* (4).
Practicums.—Geodetic Astronomy and Hydraulic Measurements (6), Graduation Thesis (4).

A trip is taken during the year to some place of Engineering importance for the purpose of observation and the taking of notes.

9. COURSE IN MECHANICAL ENGINEERING.

FRESHMAN CLASS.

FALL SESSION.—Algebra, *Newcomb's College* and *Wentworth's* (4), Geometry, *Wentworth's Plane and Solid* (2), German or French (5), English, *Genung's Hand-Book of Rhetorical Analysis* (4).
Practicums.—Drawing, Geometrical and Projection (4), Carpentry (4).
WINTER SESSION.—Trigonometry, *Chauvenet's Plane and Spherical* (3), Geometry, *Wentworth's Plane and Solid* (3), Rhetoric, *Genung's Practical* (4), German or French (5).
Practicums.—Machine Design (2), Carpentry (6).
SPRING SESSION.—Trigonometry, *Chauvenet's Plane and Spherical* (5), Old English, *Morris'* (3), German or French (5), U. S. Infantry Drill Regulations (2).
Practicums.—Machine Design (4), Wood turning (4).

SOPHOMORE CLASS.

FALL SESSION.—Analytical Geometry, *Woods'* (4), Chemistry, *Lectures on the Non-Metals* and *Harris' Lecture Notes on General Chemistry* (5), History, *Fisher's Outlines* (3), German or French (2), Surveying, *Bellows' and Hodgman's* (1).
Practicums.—Surveying (4), Chemistry (4).
WINTER SESSION.—Analytical Geometry, *Woods'* (3), Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualitative Analysis* (3), German, *Hodges' Scientific*, or French (2), History, *Fisher's Outlines* (4), Elementary Mechanics, *Wood's* (3).
Practicums.—Chemistry (8), Pattern-making (2)
SPRING SESSION.—History, *Special Treatise* (3), Differential Calculus, *Taylor's* (4), Descriptive Geometry, *Church's* (4), Mechanics of Machinery, *Kennedy's* (4).
Practicums.—Drawing, Descriptive Geometry (4), Chemistry (6).

JUNIOR CLASS.

FALL SESSION.—Applied Mechanics, *Church's* (5), Descriptive Geometry (Spherical Projections, Perspective, and Maps), *Church's* (4), Integral Calculus, *Taylor's* (3), Mechanics of Machinery, *Kennedy's* (3).

Practicums.—Forging (6), Mechanical Drawing (4).

WINTER SESSION.—Applied Mechanics, *Church's* (4), Physics, *Anthony and Brackett's* (4), Steam Engines, *Holmes'* (4), Differential Equations (2), Quaternions, *Wood's* (2).

Practicums.—Physical Measurements (4), Chipping and Filing (4).

SPRING SESSION.—Boilers, *Wilson-Flather's* (4), Machinery of Transmission, *Weisbach-Herrman's* (4), Materials of Construction, *Thurston's* (3), Physics, *Anthony and Brackett's* (4).

Practicums.—Engine Lathe Work (6), Machine Design (4).

SENIOR CLASS.

FALL SESSION.—Thermo-dynamics, Theory of Heat, Air and Gas Engines, *Röntgen-Du Bois* (3), Hoisting and Pumping Machinery (3), Lubricants (1), Geology, *Dana's* (4), Political Economy, *Walker's* (4).

Practicums.—Machine Design (6), Testing Strength of Materials (6).

WINTER SESSION.—Thermo-dynamics (Steam Engine, Refrigerating Machines, Air Compressors, etc.) (4), Indicators (2), Constitutional Law, *Cooley's* (4), Heating and Ventilation (2), Ventilating and Transporting Machinery (Locomotives, etc.) (3).

Practicums.—Machine Design (6), Standardizing Testing Instruments, Engine Tests, Boiler, Evaporation and Combustion Tests (4).

SPRING SESSION.—Mining Machinery (5), Electric Transmission of Energy, *Kapp's* (3), Hydraulic Motors, *Bodmer's* (3), International Law, *Woolsey's* (4).

Practicums.—Original Machine Design (4), Thesis Work (6).

10. COURSE IN MECHANIC ARTS.*

Years.	Session.	STUDIES.	Hours per week.	SHOP WORK AND DRAWING.	Hours per week.
FIRST YEAR.	Fall.	United States History	3	Carpentry	6
		Arithmetic	4	Free-hand Drawing	4
		Advanced English Analysis	5		
	Winter.	Algebra begun	5	Carpentry and Joinery	3
		English	5	Model and Object Drawing	5
		United States History	5		
	Spring	Algebra	5	Wood-turning	8
		English Analysis	5	Designing	4
		Book-keeping	4		
SECOND YEAR.	Fall.	English Composition	5	Pattern-making	4
		Algebra	5	Geometrical Drawing	4
		Physics	4		
	Winter.	Geometry	5	Forging	4
		Algebra	5	Orthographic Projection and Intersections	5
		Physics	4		
	Spring.	Geometry	5	Forging	4
		Algebra	2	Mechanical Drawing	6
		Applied Arithmetic	3		
		Civil Government and English	5		
THIRD YEAR.	Fall.	Algebra	4	Vise work	8
		Geometry	2	Mechanical Drawing	8
		Workshop Appliances	4		
	Winter.	Geometry	3	Machine Tool Work	8
		Trigonometry	3	Detail Drawing	8
		Rhetoric	4		
	Spring.	Trigonometry and Surveying	5	Machine Tool Work	10
		Mechanism	3	Machine Drawing	10

*Text-books for the first two years are the same as in the Preparatory Classes p 92; for the third year, the same as in the Freshman Class, Mechanical Engineering Course.

II. COURSE IN PHYSICS AND ELECTRICAL ENGINEERING.

FRESHMAN YEAR.

FALL SESSION.—Algebra, *Newcomb's College* and *Wentworth's* (4), Geometry, *Wentworth's Plane and Solid* (2), English, *Genung's Hand-book of Rhetorical Analysis* (4), German or French (5).
Practicums.—Drawing, Geometrical and Projection (4), Carpentry (4).
WINTER SESSION.—Geometry, *Wentworth's Plane and Solid* (3), Trigonometry, *Chauvenet's Plane and Spherical* (3), Rhetoric, *Genung's Practical* (4), German or French (5).
Practicums.—Forging (4), Drawing (4).
SPRING SESSION.—Trigonometry, *Chauvenet's Plane and Spherical* (5), Old English, *Morris'* (3), German or French (5), U. S. Infantry Drill Regulations (2).
Practicums.—Drawing (4), Wood Turning (4).

SOPHOMORE YEAR.

FALL SESSION.—Analytical Geometry, *Wood's* (4), Chemistry, *Lectures on the Non-Metals* and *Harris' Lecture Notes on General Chemistry* (5), German or French (2), Surveying, *Bellows and Hodgman's* (1), History, *Fisher's Outlines* (3).
Practicums.—Surveying (4), Chemistry (4).
WINTER SESSION.—Analytical Geometry, *Wood's* (3), Chemistry, *Lectures on the Metals and Harris' Manual of Qualitative Analysis* (3), German, *Hodges' Scientific* or French (2), History, *Fisher's Outlines* (4), Elementary Mechanics, *Woods'* (3).
Practicums—Pattern-making (2), Chemistry (8).
SPRING SESSION.—Differential Calculus, *Taylor's* (4), Descriptive Geometry, *Church's* (4), History, *Special Treatise* (3), Mechanics of Machinery, *Kennedy's* (4).
Practicums.—Drawing, Descriptive Geometry (4), Chemistry (6).

JUNIOR YEAR.

FALL SESSION.—Physics, *Anthony and Brackett's*, and Applied Mechanics. *Church's* (5), Integral Calculus, *Taylor's* (3), Descriptive Geometry, (Spherical Projections, Perspective and Maps), *Church's* (4), Mechanics of Machinery, *Kennedy's* (3).
Practicums.—Electrical Measurements (6), Mechanical Drawing (4).
WINTER SESSION.—Physics, *Anthony and Brackett's* (4), Practical Electricity, *Aryton's* (3), Applied Mechanics, *Church's* (4), Quaternions, *Wood's* (2), Differential Equations (2).
Practicums.—Physicial Measurements (4), Electrical Measurements (6).
SPRING SESSION.—Physics, *Anthony and Brackett's* (4), Electricity (4), Least Squares, *Merriman's* (3), Machinery of Transmission, *Weisbach-Herrman's* (4).
Practicums.—Electrical Measurements (4), Physicial Measurements (2), Mechanical Drawing (4).

SENIOR YEAR.

FALL SESSION.—Dynamo-Electric Machinery, *Thompson's* (5), Political Economy, *Walker's* (4), Thermodynamics, *Röntgen-DuBois'* (3), Machine Design, *Unwin's* (2).

Practicums.—Electrical Tests (6), Calibrating Instruments (2), Machine Designs (2).

WINTER SESSION.—Dynamo-Electric Machinery, *Thompson's* (3), Constitutional Law, *Cooley's* (4), Thermo-dynamics, *Röntgen-DuBois'* (4), Telegraph and Telephone (3), Indicator (2).

Practicums.—Dynamo and Motor Tests (4), Boiler and Engine Tests (4).

SPRING SESSION—Electric Transmission of Energy, *Kapp's* (4), International Law, *Woolsey's* (4), Hydraulic Motors (3), Mental Science, *Seelye's-Hickok's* (4).

Practicums.—Calibrating Instruments and Testing Wires and Cables (6), Research (and Thesis) (4).

POST-SENIOR YEAR.

FALL SESSION.—Theory of Electricity (3), Alternate Current Transformer, *Fleming's* (3), Geology, *Dana's* (4), Electric Lighting, *Maier, Urquhart* (4).

Practicums.—Dynamo and Motor Designing (6), Abstracts (4).

WINTER SESSION.—Theory of Electricity (4), Astronomy (3), or Constitutional History (4), Practical Astronomy (3), Electrometallurgy, and Electric Welding (4).

Practicums.—Central Stations and Installations.

SPRING SESSION.—Theory of Electricity (4), Electric Railways (3), Materials of Construction (3), Assigned Reading (5).

Practicums.—Thesis for Degree.

[NOTE.—Students who cannot complete the course for the degree of Electrical Engineer, may in the Senior year take an approved course from the Senior and Post-Senior Years and, on satisfactory completion thereof, receive the degree of B. S., in Electrotechnics.]

12. LADIES' COURSE IN LITERATURE AND SCIENCE.

[The requirements for admission to this Course are the same as for the General Science Course.]

FIRST YEAR.

FALL SESSION.—French or German (5), or each (3), History, *Fisher's Outlines* (3), English, *Genung's Hand-Book of Rhetorical Analysis* (4).
*Electives.—Algebra, *Newcomb's College* and *Wentworth's* (4), Geometry, *Wentworth's Plane and Solid* (2), Chemistry, *Lectures on the Non-Metals* and *Harris Lecture Notes on General Chemistry* (5), Latin, *Sallust's Catilne, Allen and Greenough's* (4).
Practicums.—English, Drawing and Music.

WINTER SESSION.—French or German (5), or each (3), History, *Fisher's Outlines* (4).
Electives.—Trigonometry, *Chauvenet's Plain and Spherical* (3), Geometry, *Wentworth's Plane and Solid* (3), Chemistry, *Lectures on the Metals* and *Harris' Manual of Qualitative Analysis* (3), Latin, *Virgil's Æneid, Greenough's* (4), Rhetoric, *Genung's Practical* (4), General Biology (3).
Practicum.—Drawing or Music, or both.

SPRING SESSION.—French or German (5), or each (3), History, *Special Treatise* (3), Old English, *Morris'* (3).
Electives.—Chemistry, *Lectures on the Metals, Harris' Manual of Qualitative Analysis* (3), Latin, *Cicero De Officiis, Chase and Stuart's* (4), English Literature, *Day's Introduction* (4), General Biology (4), Zoology, *Lectures* (2).
Practicums.—Industrial Drawing and Designing or Music, or both.

SECOND YEAR.

FALL SESSION.—French or German, each (2), Logic, *Day's Elements* (3).
Electives.—Higher Mathematics (4), Geology, *Dana's* (4), Political Economy, *Walker's* (4), Latin, *Horace, Satires* and *Epistles* (2), General Botany, *Lectures* (4), English Literature (3), Zoology (4).
Practicums.—Botany, or Geology for such as elect that study, Drawing, Music.

WINTER SESSION.—French or German, each (2), History of Civilization, *Guizot's* (4).
Electives.—Higher Mathematics (3), Zoology, *Packard's Briefer Course* (3), Constitutional History, *Creasy's English Constitution* (4), Geology, *Dana's* (2), Astronomy, *Young's General* (3), Latin, *Tacitus* (3), German, *Hodge's Scientific German* (2), English (3), Botany (4).
Practicums.—Botany, or Geology or Zoology for such as elect either of those studies, Music and Drawing.

SPRING SESSION.—English Literature, *Gilman's History* (3), Mental *Seelye's Hickok's* (4), Moral Science, *Seelye's Hickok's* (4).
Electives.—Astronomy, *Young's General* (3), Zoology, *Packard's Briefer Course* (2), International Law, *Woolsey's* (4).
Practicums.—Music, Drawing.

* In addition to the required studies, such number of electives must be taken as to make up fifteen hours per week.

13. INDUSTRIAL ART AND DESIGN.

SCHEME OF WORK FOR SPECIAL CLASS.

Drawing—From geometrical solids, casts, plants, furniture.
Study of plant and other natural forms for suggestions for design.
Designs to fill given space.
Painting—Tinting, groups, light and shade.
Shading, from cast, ornament, and plant form.
Coloring, from plants, drapery, and still life groups.
Color harmony, designs in several schemes of color.
Modeling—From cast, from flat, from nature.
Designs for wood and stone carving, and terra cotta ornaments for architectural enrichments.
Designing—Cast and wrought metals.
Oil cloth.
Wall paper.
Stained glass.
Forms for pottery and appropriate decorations for the same, etc.

TWO YEARS' SCHEME OF PRACTICUM WORK—PREPARATORY DEPARTMENT.

First Year.

FALL SESSION.—Free hand Drawing, from blackboard or chart, including representations of objects and ornaments composed of curved and straight lines. Historical Ornaments, Lettering (Modeling).
WINTER SESSION.—Object Drawing, supplemented with Elementary Perspective (Modeling).
SPRING SESSION.—Elementary Design, treating of the underlying principles of good design; Plant Analysis, for the purpose of design.

Second Year.

FALL SESSION.—Object Drawing, with study of Light and Shade as far as practicable; Introductory Lessons in Architecture, leading to the study of Historic Styles of Ornaments, with a synopsis of the principal styles of the same.
WINTER SESSION.—Applied Design, Modeling and Casting.
SPRING SESSION.—Color Harmony, applied to design.

14. MUSICAL DEPARTMENT.

COURSE OF STUDY FOR THE PIANOFORTE.

Selections from the following works, or their equivalents:—Elementary Exercises and Simple Duets; Technical Studies; Czerny, op. 849; Köhler, op. 50; Heller, op. 47; Loeschhorn, op. 66; Bertini, ops. 29 and 32; Czerny, op. 299; Krause, ops. 2 and 5; Heller, ops. 45 and 46; Bach's Little Preludes and Fugues; Cramer (Bülow edition); Clementi's Gradus ad Parnassum; Eschmann, op. 16; Heller, op. 16; Moscheles, op. 70; Chopin, ops. 10 and 25; Mayer, op. 119.

Sonatinas and Sonatas selected from Clementi, Kuhlan, Krause, Mozart, Beethoven, and others. Selections from Mendelssohn, Chopin, Weber and the best modern composers.

STUDENTS IN 1891–92.

GRADUATE STUDENTS.

Names.	*Courses.*	*Residences.*
HALEY, EDWIN J.,	(Chem.,)	Philadelphia.
†WEIDNER, FRALEY NIEBUHR,	(Chem.,)	Chester.

UNDERGRADUATE STUDENTS.

SENIOR CLASS.

ABREU, DIEGO WENCESLAO,	(Gen. Agr.,)	Santa Clara, Cuba.
ATHERTON, CHARLES M. H.,	(Chem.,)	State College.
AULL, CHARLES ELMER,	(Civ. Eng.,)	Pittsburgh.
BOHN, WELLINGTON WARNES,	(Phys. and El.,)	Robesonia.
†BROWN, SYDNEY HERBERT,	(Phys. and El.,)	Christ Ch., N. Zeal.
BUSH, EDWARD WALLACE,	(Civ. Eng.,)	Susquehanna.
CRAWFORD, SAMUEL GRANT,	(Civ. Eng.,)	Minersville.
GLENN, THOMAS OLIE,	(Chem.,)	Fillmore.
HERR, HERMAN HORACE,	(Mech. Eng.,)	Wheatland Mills.
†HILDEBRAND, CHARLES CONRAD,	(Chem.,)	Philadelphia.
HILE, CHARLES HARVEY,	(Mech. Eng.,)	Bellefonte.
KESSLER, RAPHAEL,	(Civ. Eng.,)	Brandt.
LOYD, NELSON MCALLISTER,	(Phys. and El.,)	Oakland Mills.
MCDOWELL, MILTON SPEER,	(Chem.,)	Milroy.
MCKEE, WILLIS,	(Civ. Eng.,)	State College.
MEEK, ELOISE KELLER,	(Lat. Sci.,)	Bellefonte.
POND, FRANCIS JONES,	(Chem.,)	State College.
PRATT, HOWARD RILEY,	(Civ. Eng.,)	Fleming.
READ, AUGUSTUS CLEMENT,	(Civ. Eng.,)	Delano.
RUMBERGER, HOWARD KNOLL,	(Civ. Eng.,)	Warrior's Mark.
SCHAFFER, MARGARET ELLEN,	(Biology,)	State College.
†SHIELDS, JOHN FRANKLIN,	(Civ. Eng.,)	Chester.
STEPHENS, JOHN WEBSTER.	(Civ. Eng..)	Mahaffey.

† Not in full standing

JUNIOR CLASS.

Names.	*Courses.*	*Residences.*
BUTTS, EDWARD PONTANY,	(Civ. Eng.,)	Bellefonte.
CAMP, EMMA ELIZA,	(Gen. Sci.,)	Wyalusing.
CAUGHEY, CASSIUS MCCREARY,	(Civ. Eng.,)	Fairview.
DALE, FREDERICK,	(Gen. Sci.,)	Lemont.
DUNKLE, HERVY EDWARD,	(Mech. Eng.,)	Huntingdon.
EACHUS, CHARLES,	(Chem.,)	Coatesville.
†FAY, CHARLES ROSS,	(Chem.,)	Williamsburg.
FOSTER, JOHN,	(Mech. Eng.,)	State College.
FURST, JOHN KIEFFER,	(Civ. Eng.,)	Cedar Springs.
†GIRVIN, CHARLES JEFFREYS,	(Mech. Eng.,)	Philadelphia.
GREENWOOD, HARRY EDGAR,	(Mech. Eng.,)	Rockhill Furnace.
GROSS, DANIEL WINGERD,	(Civ. Eng.,)	Harrisburg.
HAAS, GEORGE HERMAN,	(Civ. Eng.,)	Selinsgrove.
KRUMRINE, SIDNEY,	(Chem.,)	State College.
MATTERN, HAYS WAITE,	(Civ. Eng.,)	Warrior's Mark.
MATTERN, ROY BRISCOE,	(Chem.,)	Milesburg.
MCDONNELL, MILTON EARLE,	(Chem.,)	Florence.
†MCELWAIN, CARRIE MABEL,	(Civ. Eng.,)	W. Springfield, Mass.
ORBIN, FRANK,	(Mech. Eng.,)	McKeesport.
ROTHROCK, WILLIAM POWELL,	(Civ. Eng.,)	Bellefonte.
SAYLOR, WILLIAM HENRY,	(Gen. Agr.,)	Meyersdale.
SMALL, JOHN MURPHY,	(Lat. Sci.,)	Harrisburg.
WALSH, JOHN GREER, JR.,	(Chem.,)	West Chester.
WELD, FRED. FALCONER,	(Civ. Eng.,)	Sugar Grove.
WIELAND, GEORGE REBER,	(Chem.,)	State College.
WILLIAMSON, RICHARD WOOD,	(Lat. Sci.,)	Huntingdon.

†Not in full standing.

SOPHOMORE CLASS.

Names.	*Courses.*	*Residence.*
KREMER, CHARLES EARNST,	(Chem.,)	Ridley Park.
AIKENS, JAMES PHIL.,	(Phys. and El.,)	Milroy.
BANKS, WILLIAM,	(Mech. Eng.,)	Indiana.
BARNDOLLAR, FRED,	(Mech. Eng.,)	Everett.
BELT, ABRAM DINSMORE,	(Mech. Eng.,)	Wellsville.
BOWMAN, ROGER,	(Civ. Eng.,)	Philadelphia.
BRENNEMAN, PAUL BRUCE,	(Civ. Eng.,)	Saxton.
BREWER, JOHN MAITLAND,	(Civ. Eng.,)	Philadelphia.
CHAMBERS, JNO. THOMPSON, JR.,	(Mech. Eng.,)	Blair Station.
DALE, WILLARD,	(Phys. and El.,)	Lemont.
DAMON, ALBERT FOSTER,	(Civ. Eng.,)	Darby.
† DICKINSON, WILLIS MEYER,	(Mech. Eng.,)	Philadelphia.
†DOWLER, HARRY PATTON,	(Civ. Eng.,)	Burnside.
†GRAY, MINNIE EDITH,	(Gen. Sci.,)	State College.
GUYER, ARTHUR GEORGE,	(Civ. Eng.,)	Altoona.
HENCH, JOHN BENTON,	(Phys. and El.,)	Northumberland.
†HOLLIDAY, MYRA,	(Gen. Sci.,)	Bellefonte.
HUNTER, SUSANNAH SOPHIA,	(Gen. Sci.,)	Stormstown.
KIRK, EDWIN BROSIUS,	(Phys. and El.,)	Kennett Square.
KNITTLE, ALBERT DANIEL,	(Phys. and El.,)	Port Carbon.
KREMER, CHARLES EARNST,	(Chem.,)	Ridley Park.
MARTIN, RALPH FITCH,	(Mech. Eng.,)	Shenandoah.
MATTERN, FRANK KEITH,	(Mech. Eng.,)	Warrior's Mark.
MATTERN, LEWIS WILSON,	(Chem.,)	Warrior's Mark.
† MILLER, GEORGE POTTER,	(Gen. Sci.,)	Pleasant Gap.
MUSSER, BOYD ANSPACH,	(Gen. Sci.,)	State College.
PATRICK, JAMES FREDERICK,	(Civ. Eng.,)	Mill City.
PYNE, EDWARD, JR.,	(Phys. and El.,)	Hingham, Mass.
QUIGLEY, JAMES EDWIN,	(Mech. Eng.,)	Blanchard.
REBHUN, WILLIAM HENRY,	(Chem.,)	Natrona.
SILLIMAN, WILLIAM ALEXANDER,	(Gen. Sci.,)	Pottsville.
STURDEVANT, PAYNE P.,	(Civ. Eng.,)	Wilkes-Barre.
SWARTZ, MARK TRUMAN,	(Mech. Eng.,)	Lancaster.
† THOMPSON, WILLIAM CLAUDE,	(Lat. Sci.,)	Lykens.
WAITE, WALTER BLAIR,	(Mech. Eng.,)	Water Street.
†WALKER, THOMAS HOLMES,	(Gen. Sci.,)	Option.
WHITE, JOHN,	(Mech. Eng.,)	Milroy.

† Not in full standing.

FRESHMAN CLASS.

Names.	*Courses.*	*Residence.*
BARTON, DUNHAM,	(Phys. and El.,)	Mercer.
BAUMGARDNER, H. ELSWORTH,	(Mech. Eng.,)	State College.
BEAVER, HUGH MCALLISTER,	(Gen. Sci.,)	Bellefonte.
BENDER, JOHN ALOIN,	(Phys. and El.,)	Altoona.
†BLACKBURN, ALBERT ENGLES,	(Gen. Sci.),	Fishertown.
BROWN, WILLIAM HENRY,	(Phys. and El.,)	Philadelphia.
BURKETT, CHARLES WATSON,	(Phys. and El.,)	Remington.
CARR ER, AUBREY DARCY,	(Lat. Sci.,)	Brookville.
CARTWRIGHT, CHAS. KENNEDY,	(Mech. Eng.,)	Youngstown, Ohio.
CLEMENT, JOSEPH BERTRAM,	(Phys. and El.,)	Woodbury, N. J.
CUMMINS, THOMAS RISDON,	(Civ. Eng.,)	Ashtabula, Ohio.
DUNSMORE, WILLIAM DOUGLAS,	(Civ. Eng.,)	Harrisburg.
FLECK, HARRY GEORGE,	(Civ. Eng.,)	Allegheny.
GEARY, HENRY HOLLINGSHEAD,	(Phys. and El.,)	Catawissa.
GLENN, REUBEN GRAY,	(Mech. Eng.,)	Fillmore.
GRAY, BUDD,	(Mech. Eng.,)	Tyrone.
GREER, ROBERT BRUCE,	(Gen. Sci.,)	Butler.
HALL, ALLAN EVERETT,	(Lat. Sci.,)	Brookville.
HALL, JACOB EUGENE,	(Chem.,)	Fleming.
HARDER, EDWIN PARTRIDGE,	(Phys. and El.,)	Catawissa.
HARRIS, EDWARD HUMES,	(Gen. Sci.,)	Bellefonte.
HARRIS, JOHN LEWIS,	(Phys. and El.,)	Sharon.
†HEPPENSTALL, CHAS. WILLIAM,	(Mech. Eng.,)	Pittsburgh.
HOLLENBECK, LEE JAY,	(Gen. Sci.,)	West Springfield.
HORTON, BYRON BARNES,	(Gen. Sci.,)	Sheffield.
KEEFER, MELVIN JESSE,	(Phys. and El.,)	Sunbury.
KIEFFER, JOHN BRAINERD,	(Civ. Eng.,)	Hagerstown, Md.
†LUEDER, FRANCIS ASBURY,	(Agr.,)	Nanticoke.
MACDONALD, RALPH LASHELLE,	(Gen. Sci.,)	State College.
MARSHALL, JAMES G., JR.,	(Phys. and El.,)	Bellefonte.
MATHIAS, ROBERT,	(Phys. and El.,)	Chalfont.
MOORE, ROY SAXTON,	(Civ. Eng.,)	Canoe Creek.
MOORE, WILLIAM JAMES,	(Mech. Eng.,)	Altoona.
NEWBURN JOHN KENWORTHY,	(Gen. Sci.,)	Bellevue.
PATTERSON, DAVID LESLIE, JR.,	(Mech. Eng.,)	Allegheny.
†OLIVEIRA LUIS ALVES DE, JR.,	(Civ. Eng.,)	Rio Janerio, Brazil.
PEFFER, HARRY CREIGHTON,	(Chem.,)	Tarentum.
PRICE, GEORGE L. WHITESELL,	(Mech. Eng.,)	Allegheny.

† Not in full standing.

Names.	*Courses.*	*Residence.*
ROBBINS, MORRISON JOHN,	(Agr.,)	Robbin's Station.
ROBISON, JOHN ISAAC,	(Mech. Eng.,)	State College.
RODGERS, JAMES FRANK,	(Mech. Eng.,)	Allegheny.
RUTHERFORD, THOMAS WILSON,	(Civ. Eng.,)	Harrisburg.
SCOTT, CHARLES EZRA,	(Mech Eng.,)	Scranton.
SEIBERT, GEORGE EDWARD,	(Mech. Eng.,)	Bellefonte.
SMITH, FRANCIS GURNEY,	(Lat. Sci.,)	Tyrone.
SNYDER, GEORGE BRADY,	(Gen. Sci.,)	Blanchard.
SNYDER, JOHN EDWARD,	(Mech. Eng.,)	Blanchard.
SPENCE, GEORGE KNOX,	(Gen. Sci.,)	McKee's Rocks.
STEVENSON, EDWIN LIVINGSTON,	(Civ. Eng.,)	Pittsburgh.
STEWART, HARRY,	(Phys. and El.,)	Braddock.
STUART, WILLIAM ALEXANDER,	(Mech. Eng.,)	State College.
TAYLOR, HUGH STUART,	(Mech. Eng.,)	Bellefonte.
TRONE, MAURICE NEWTON,	(Mech. Eng.,)	Hanover.
VASTINE, JACOB MARION,	(Phys. and El.,)	Catawissa.
†WALEEN, PIETRUS ALFRED,	(Mech. Eng.,)	Lewisburg.
†WHERRY, AILIE MAY,	(Sp. Ladies',)	Shippensburg.
WIELAND, ROBERT WARING,	(Agr.,)	State College.
WISHART, HARLAN LAWRENCE,	(Chem.,)	Wells' Tannery.
WOODRING, SAMUEL KLINE,	(Civ. Eng.,)	Bellefonte.

IRREGULAR—NOT CLASSIFIED.

BELL, EVA PERSILLA,	State College.
KYLE, FRANK, (Civ. Eng.,)	Milroy.
MORGAN, LOUIS RAYMOND,	State College.
PATTERSON, MAY,	State College.
SMILEY, WARREN PRICE, (Chem.,)	Factoryville.
STUART, ELIZABETH MUSSER,	State College.

SHORT (LECTURE) COURSE IN AGRICULTURE.

BRACKBILL, MARK L.,	Strasburg.
GERBER, SAMUEL S.,	Mount Joy.
RICE, EDWARD M.,	Harmonsburgh.
WELD, ROBERT J.,	Sugar Grove.

† Not in full standing.

PREPARATORY STUDENTS.

SECOND YEAR.

Names.	*Courses.*	*Residences.*
†BECK, MARY ELIZABETH,	(Gen. Sci.,)	Nittany.
BEUGLER, CHARLES ERNEST,	(Gen. Sci.,)	Keuka College, N. Y.
BLAIR, SAMUEL HOWARD,	(Mech. Arts,)	Tyrone.
BRIDGE, BESSIE,	(Lat. Sci.,)	Clearfield.
BROWN, WILLIAM,	(Mech. Arts,)	Philadelphia.
CALDER, WALLACE REAMSHART,	(Mech. Arts,)	Harrisburg.
†CAMPBELL, EDGAR CLARK,	(Mech. Arts,)	Washington, D. C.
†CARTER, LEWIS BENSCOTER,	(Lat. Sci.,)	Retta.
COLLINS, JOHN SIVERT,	(Gen. Sci.,)	Franklin.
CORBETT, STANLEY WELLS,	(Gen. Sci.,)	Clarion.
DAVIS, McLAIN WHITE,	(Mech. Arts,)	Indiana.
DIXON, ISRAEL KINCH,	(Mech. Arts,)	Warrior's Mark.
ELLIOTT, McKENZIE,	(Gen. Sci.,)	Washington, D. C.
EYER, JOHN RITTER,	(Gen. Sci.,)	Catawissa.
GINGRICH, CHARLES SUMNER,	(Mech. Arts,)	Landisville.
GIRVIN, ROBERT M., JR.,	(Mech. Arts,)	Philadelphia.
GREENLAND, WALTER W., JR.,	(Gen. Sci.,)	Clarion.
JACKSON, ANDREW CHARLES,	(Mech. Arts,)	Osceola Mills.
†JOHNSON, LEMUEL LOBB,	(Gen. Sci.,)	Lansdowne.
JONES, HOWARD,	(Gen. Sci.,)	Minersville.
KELKER, RUDOPH F., JR.,	(Mech. Arts,)	Harrisburg.
KUHN, ALICE SARAH,	(Gen. Sci.,)	State College.
LEATTOR, WILLIAM JOHN,	(Gen. Sci.,)	McVeytown.
†LYON, JOHN PORTER,	(Gen. Sci.,)	Philadelphia.
LYTLE, JOHN ALBION,	(Mech. Arts,)	Downs, Kansas.
MACKEY, WILLIS EMORY,	(Gen. Sci.,)	Altoona.
MAGUIRE, WALTER PERCIVAL,	(Gen. Sci.,)	Huntingdon.
McCREA, ROBERT ALVIN,	(Gen. Sci.,)	Pittsburgh.
McCORMICK, JOHN FRANKLIN,	(Gen. Sci.,)	State College.
McFARLAND, GEORGE KEIM,	(Gen. Sci.,)	West Chester.
McKEE, GEORGE MILTON,	(Gen. Sci.,)	Strode's Mills.
McKIBBIN, JAMES MALCOLM,	(Lat. Sci.,)	Buck Valley.
†METZ, FRED. THORNTAIN,	(Gen. Sci.,)	Philipsburg.
†MISH, FRED.,	(Gen. Sci.,)	Middletown.

† Not in full standing.

Names.	*Courses.*	*Residences.*
MITCHELL, ELIZA THOMPSON,	(Gen. Sci.,)	State College.
MOTZ, JOHN FRANCIS,	(Gen. Sci.,)	Woodward.
†PATTERSON, NELLIE OLIVE,	(Gen. Sci.,)	State College.
PATTERSON, WILLIAM FRANCIS,	(Gen. Sci.,)	New Castle.
†PHELPS, LESTER PITT,	(Gen. Sci.,)	Merchantville, N. J.
PRICE, HENRY THOMPSON	(Lat, Sci.,)	Allegheny.
ROBISON, FRED. ARTHUR,	(Mech. Arts,)	State College.
SALTSMAN, JESSIE GERTRUDE,	(Gen. Sci.,)	Hastings.
†SAWYER, MABEL,	(Gen. Sci.,)	Leavenworth, Kansas.
SMITH, ABSALOM WOODWARD,	(Mech. Arts,)	Blairsville.
THOMPSON, CLARENCE MARTIN,	(Gen. Sci.,)	Philadelphia.
THOMPSON, JAMES,	(Gen. Sci.,)	State College.
TROUT, JULIAN CHARLES,	(Gen. Sci.,)	Mount Union.

FIRST YEAR.

†ATHERTON, HARRIET CUSHMAN,	(Lat. Sci.,)	State College.
†ATHERTON, HELEN HOITT,	(Lat. Sci.,)	State College.
BELL, TORRENCE,	(Mech. Arts,)	State College.
BOYER, JOHN ABRAHAM,	(Gen. Sci.,)	Grantville.
BARNES, JOHN ALBERT,	(Mech. Arts,)	Philipsburg.
†BUCKHOUT, ALBERT TUTTLE,	(Gen. Sci.,)	State College.
†BUCKHOUT, NATHAN WHITE,	(Gen. Sci.,)	State College.
CONNOLLY, JAMES JOHN,	(Gen. Sci.,)	Towanda.
†DAVIS, CLARA,	(Lat. Sci.,)	State College.
†DAVIS, GRACE,	(Lat. Sci.,)	State College.
EARSEMAN, JOHN SATTERFIELD,	(Mech. Arts,)	Pittsburgh.
EDMISTON, HARRY DAWSON,	(Mech. Arts,)	State College.
EYER, WILLIAM JOHN,	(Gen. Sci.,)	Catawissa.
†GARNER, NETTIE BELL,	(Gen. Sci.,)	State College.
†KRAMER, JOSEPH G.,	(Lat. Sci.,)	Trevorton.
KUHN, GRACE EVANGELINE,	(Lat. Sci.,)	State College.
KUHN, MABEL JEAN,	(Lat. Sci.,)	State College.
KUHN, MINNIE WHITNEY,	(Lat. Sci.,)	State College.
LOWELL, GEORGE ALEXANDER,	(Gen. Sci.,)	Holton, Kansas.
MCCAIN, SAMUEL HOWARD,	(Gen. Sci.,)	Brockwayville.
MCCAIN, WILLIAM ALEXANDER,	(Gen. Sci.,)	Brockwayville.
MCGEE, FRANK RAYMOND,	(Gen. Sci.,)	McGee's Mills.
†MCKEE, MARY G,	(Gen. Sci.,)	State College.
†MILLER, LANDIS BARR,	(Mech. Arts,)	Lancaster.
MILLER, WILLIAM H. H.,	(Mech. Arts,)	State College.
†MUSSER, GEORGE HARLEY,	(Gen. Sci.,)	Pine Grove Mills.
†MUSSER, LYDIA CATHARINE,	(Gen. Sci.,)	State College.

†Not in full standing.

Names.	*Courses.*	*Residences.*
OLDS, FRANK LYMAN,	(Mech. Arts,)	Circleville, Ohio.
OLDS, MAYTEE SAVAGE,	(Lat. Sci.,)	State College.
OLDS, WILLIAM CURTIS,	(Mech. Arts)	State College.
†PAGE, JOHN AUGUSTINE,	(Gen. Sci.,)	Pittsburgh.
RENNINGER, ABNER R.,	(Mech. Arts,)	Harrisburg.
RUTHERFORD, MARSHALL,	(Mech. Arts,)	Harrisburg.
SCATTERGOOD, SAMUEL F.,	(Lat. Sci.,)	Driving Park.
THOME, CHARLES CARROLL,	(Gen. Sci.,)	Shellsville.
THOMPSON, JAMES VOORHEES,	(Gen. Sci.,)	State College.
THOMPSON, ELIZABETH BOAL,	(Gen. Sci.,)	Lemont.
THOMPSON, GEORGE BOAL,	(Gen. Sci.,)	Lemont.
THOMPSON, WILLIAM,	(Gen. Sci.,)	State College.
WALTHER, HARRY JACOB,	(Mech. Arts,)	Phillipsburg.

†Not in full standing.

DEGREES CONFERRED IN 1891.

BACHELORS OF SCIENCE.

LATIN-SCIENTIFIC COURSE—
MAUD MOORE, *Lemont.*

COURSE IN CHEMISTRY—
JOHN WESLEY FIELDS, *McConnellsburg,*
FRALEY NIEBUHR WEIDNER, *Chester.*

COURSE IN CIVIL ENGINEERING—
WALTER MASON CAMP, *Wyalusing,*
THOMAS ALVIN GILKEY, *Neshannock Falls,*
NOAH HERTZLER SULOFF, *Patterson,*
DILWORTH MILLER TAYLOR, *Media.*

COURSE IN MECHANICAL ENGINEERING—
WILLIAM AUSTIN BARTLEY, *Bellefonte,*
FRANCIS ADDISON GRIFFIN, *Pittsburgh,*
ARTHUR GLENN MCKEE, *State College.*

COURSE IN PHYSICS AND ELECTROTECHNICS—
CHARLES MAXWELL GREEN, *Trenton, N. J.,*
HUGH HAMILTON, JR., *Thompsontown,*
HARRY DAVID LONG, *Fayetteville.*

CERTIFICATE FOR SPECIAL COURSE IN CIVIL ENGINEERING—

GEORGE CALBREATH CLARKE, *McVeytown.*

HONOR MEN.

First Honors.	*Second Honors.*
WALTER MASON CAMP,	CHARLES MAXWELL GREEN,
JOHN WESLEY FIELDS.	DILWORTH MILLER TAYLOR.

COMMENCEMENT ORATORS.

WALTER MASON CAMP,
JOHN WESLEY FEILDS,
ARTHUR GLENN MCKEE,

NOAH HERTZLER SULOFF,
Valedictorian.
DILWORTH MILLER TAYLOR.

THESES OF THE GRADUATING CLASS.

Theoretical Determination of proportions in a 6x8 Ide Engine and Comparison of this with Results obtained by Experimental Tests.
WILLIAM A. BARTLEY.

The Location of an Electric Railroad between State College and Lemont.
WALTER M. CAMP (jointly with Gilkey).

The Sanitary Examination of a proposed Water Supply for State College, and its Comparison with other Waters in the Vicinity.
JOHN W. FIELDS.

The Location of an Electric Railroad between State College and Lemont.
THOMAS A. GILKEY (with Camp.)

Electric Railroad between State College and Lemont.
CHARLES M. GREEN.

Experimental Determination of the Modulus of Elasticity of Trade Steels.
FRANCIS A. GRIFFIN.

Study of a Brush Closed-Coil, Compound-Wound, Constant Potential 100-light Dynamo.
HUGH HAMILTON, JR.

Design for a Constant Potential, Incandescent Dynamo, 110 Volts and 200 Ampere capacity.
HARRY D. LONG.

Theoretical and Experimental Determination of the Efficiency of certain Injectors and Inspirators.
ARTHUR G. McKEE.

Description of certain Plants native to the College Woods.
MAUD MOORE.

Gravity Supply of Water for State College, including Estimates and Location of Pipe-line.
NOAH H. SULOFF (with Clarke & Taylor).

Gravity Supply of Water for State College, including Estimates and Location of Pipe-line.
DILWORTH M. TAYLOR (with Clarke & Suloff).

Hydric Dioxide as an Oxidizing Reagent for the Quantitative Determination of Lead.
FRALEY N. WEIDNER.

Gravity Supply of Water for State College, including Estimates and Location of Pipe-line.
GEORGE C. CLARKE (with Suloff & Taylor).

PRIZES AND HONORS.

The following prizes have been established :

THE ENGLISH PRIZE, to that student in a Regular Course in the Preparatory Department who shall excel in the English of the second year.

THE MCALLISTER PRIZE, the gift of General James A. Beaver, to that member of the Freshman class who shall excel in the studies preparatory to admission to the College.

THE AGRICULTURAL PRIZE, to that member of the Senior class who shall excel in the studies of the Agricultural Course.

THE ORATORICAL PRIZE, to that member of the Junior class who shall excel in the composition and delivery of an English oration.

THE ORVIS PRIZES, $25, $15 and $10, respectively, the gift of the Honorable John H. Orvis, to the three students who shall maintain the highest rank in the Mathematical studies of the Sophomore year.

Any of the above prizes may, in any year, be withheld if no student attains a sufficiently high grade.

Beginning with 1890, graduation honors are assigned as follows :

1. Honors of the first class are awarded to the fifteen per cent., or the nearest integral number thereto, of the graduates from full College courses of four years, ranking highest in general scholarship ; but no honor of this kind is awarded to a student having a final grade for the entire course of less than 83. Honors of the second class are awarded to an equal number of those ranking next in scholarship ; but no honor of this class is awarded to a student having a final grade for the entire course of less than 78.

2. From the fifty per cent. of the graduating class having, at the close of the Winter Session, Senior year, the highest average grades in all subjects, the five students having the highest grades in essays and rhetoricals are assigned Commencement parts. From these five the class select their Valedictorian, who delivers only the valedictory.

PRIZE MEN AND HONORS.

(For the last five years.)

English Prize.

1887—MINERVA A. ROOP, 1889—HARRY E. GREENWOOD,
1888—CHARLES H. HILE, 1890—ROGER BOWMAN.
1891—ALBERT E. BLACKBURN, OSCAR P. REDFORD.

McAllister Prize.

1887—HARRY R. LEYDEN, 1889—CHARLES H. HILE,
1888—MINERVA A. ROOP, 1890—J. MURPHY SMALL.
1891—JOHN M. BREWER.

Junior Oratorical Prize.

1887—GEORGE M. DOWNING,
1888—ALEXANDER A. PATTERSON,
1889—1st. BENJ. W. DEMMING,
1889—2d. { IRA C. M. ELENBERGER, JAMES C. MOCK.
1890—HUGH HAMILTON, JR.,
1891—MILTON S. MCDOWELL.

Orvis Prizes.

1887—ROBERT P. SWANK,
1888—1st. PHILIP J. DARLINGTON,
2d. { FRED. A. BRYAN, HARRY R. LEYDEN,
1889—1st. { WALTER M. CAMP, JOHN F. SHIELDS,
2d. DILWORTH M. TAYLOR,
1890—1st. WILLIS MCKEE,
2d. CHARLES H. HILE,
3d. RAPHAEL KESSLER.

Honorable Mention:—DONALD L. SOMERVILLE,

1891—1st. FRED. F. WELSH,
2d. HERVY E. DUNKLE,
3d. EMMA E. CAMP.

Agricultural Prize.

1890—RALPH L. WATTS.

Robert's Military Prizes, 1888.

DISCIPLINE, $100.

1st, $30—CADET JONES,
2d, $20—CADET EVANS,
3d, $15—CADET HAWK,
4th, $10—CADET GOSSLER,
5th, $10—CADET MCLEAN,
6th, $5—CADET CAMP,
7th, $5—CADET SWANK,
8th, $5—CADET BEAVER.

TACTICS, $100.

Officers and Non-Commissioned Officers.

1st, $20—CADET GOSSLER,
2d, $15—CADET BEAVER,
3d, $10—CADET MITCHELL,
4th, $5—CADET MCLEAN.

Freshmen.

1st, $20—CADET WEIDNER,
2d, $15—CADET CAMP,
3d, $10—CADET ALLEN,
4th, $5—CADET FIELDS.

DRILL, $75.

1st, $25—CADET PORTER,
2d, $20—CADET JONES,
3d, $15—CADET BEAVER,
4th, $10—CADET LEYDEN,
5th, $5—CADET MORRIS.

TARGET PRACTICE, $25.

1st, $10—CADET MOCK,
2d, $5—CADET LEYDEN,
3d, $5—CADET GLENN, D. L.,
4th, $5—CADET PORTER.

MUSICIAN, $8.

CADET JACKSON, W. B.

HONORS AT GRADUATION.

	First.	*Second.*
1887	WM. PENN FISHER, JR.,	WM. FULLERTON WHITE.
1888	GEO. C. MCKEE,	WM. M. PORTER.
1889	ELIZABETH B. MEEK,	ALEXANDER A. PATTERSON,
1890	GILBERT A. BEAVER, FRED. A. BRYAN, HENRY R. LEYDEN,	ANTOINETTE D. BALL, GEORGE S. DEMMING, WILLIAM B. JACKSON.
1891	WALTER M. CAMP, JOHN W. FIELDS,	CHARLES M. GREEN, DILWORTH M. TAYLOR.

THE ALUMNI ASSOCIATION.

This Association was organized in 1874, "to renew the associations of college days, to promote fraternal feeling, and facilitate intercourse" among the graduates of the College. With these objects in view, it holds an annual reunion at the College during Comencement week, and on this occasion the "Alumni Address" is delivered by an orator chosen by the Association.

The Alumni are also called together to perform a duty devolved on them by the revised charter—the election of an alumnus to represent them for three years in the Board of Trustees. Their present representatives in the Board are Cyrus Gordon of the class of '66, James F. Robb of the class of '80, and Gabriel Hiester of the class of '68.

The meeting of the Alumni as electors (in 1892) will be held on Wednesday, June 29. (This date is liable to change, the present year.)

The Alumni Record can be had by members on application to the Historian.

Officers for the Year 1891–92.

PRESIDENT, ... GEORGE M. DOWNING, '88.
SECRETARY AND TREASURER, ... LOUIS E. REBER, '80.
HISTORIAN, ... WM. A. BUCKHOUT, 68.

ALUMNI.

CLASS OF 1861.

Name and Residence. — *Occupation.* — *Course.**

BANKS, JOHN N., Indiana, ... Agriculture.
Lawyer.

CHURCH, A. C., Kingston, ... Agriculture.
Lumber dealer.

ECKMAN, JOHN W., Pulaski, Virginia, ... Agriculture.
General Manager Pulaski Iron Works.

HOLLIDAY, SAMUEL V., Washington, D. C., ... Agriculture.
United States Commissioner of Customs.

ISETT, JOHN D., ... Agriculture.
Died in 1881.

* Previous to 1866 only one course was provided

Name and Residence. *Occupation.* *Course.**

LYTLE, MILTON S., Huntingdon, ... Agriculture.
Lawyer.

MCCORMICK, E. P., Philadelphia, ... Agriculture.
Lawyer.

MILES, JAMES, ... Agriculture.
Died in 1887.

SMITH, C. ALFRED, Chicago, Ill., ... Agriculture.
Manager McIntosh Battery and Optical Company.

TROUTMAN, C. E., Washington, D. C., ... Agriculture.
Adjutant General's office.

TROUTMAN, LYNN C., Philadelphia, ... Agriculture.
Dye stuffs and chemical trade.

CLASS OF 1862.

ALEXANDER, J. P., Rapidan, Va., ... Agriculture.
Farmer.

BARNES, WILLIAM R., ... Agriculture.
Died in 1883.

BRENEMAN, H. R., Lancaster, ... Agriculture.
Coal and insurance business.

FISHER, ALFRED J., ... Agriculture.
Died in 1882.

FURST, ROBERT H., Cedar Springs, Clinton county, . Agriculture.
Lumber and milling business.

GLEIM, GEORGE JR., M. D., Cornwall, ... Agriculture.
Physician.

HARVEY, HENRY T., Lock Haven, ... Agriculture.
Lawyer.

MILES, JOHN F., Miles Grove, ... Agriculture.
Real estate dealer.

MCCOY, FRANK, Milesburg, ... Agriculture.
Iron manufacturer.

ORR, J. W., ... Agriculture.

PEFFER, B. B., ... Agriculture.

POTTER, JOHN I., Bellefonte, ... Agriculture.
With Pennsylvania Railroad Company.

SHINN, WILLIAM A., Brooklyn, N. Y., ... Agriculture.
Lawyer.

THOMPSON, JOHN I., JR., Lemont, ... Agriculture.
Bookkeeper of the Pennsylvania State College.

* Previous to 1866 only one course was provided

Name and Residence. *Occupation.* *Course.**

WALKER, THOMAS P., M. D., Dunbar, ... Agriculture.
Physician.

WATTS, FREDERICK, Carlisle, ... Agriculture.

CLASS OF 1863.

BLEE, DANIEL B., ... Agriculture.

GORDON, J. D., ... Agriculture.
Died in 1887.

GORDON, THEODORE B, ... Agriculture.
Died in 1887.

KISTERBOCK, JOSIAH, Philadelphia, ... Agriculture.
President City National Bank.

MILLS, W. W., Dunmore, ... Agriculture.
Master Machinist with D., L. & W. Railroad Company.

MYERS, S. S., Philadelphia, ... Agriculture.
With Bœder, Adamson & Co., manufacturers of glue.

CLASS OF 1864.

[Owing to an interruption of four months, caused by the absence of the Senior Class in the army as Hundred Days' Men, no class was graduated in 1864.]

CLASS OF 1865.

BLICKENSDERFER, ULRIC, Chicago, Ill., ... Agriculture.
Lawyer.

CROOK, FRANK, New York, ... Agriculture.
Chemist.

ELDRED, JOHN E., M. D., Elmira, N. Y., ... Agriculture.
Physician.

MILLIGAN, FRANK, St. Joseph, Mo., ... Agriculture.
General Freight and Passenger Agent
St. Joseph and Grand Island railroad.

McLANAHAN, W. W., Grand Rapids, Mich., ... Agriculture.
In hospital service.

STOKES, FRANK, ... Agriculture.

* Previous to 1866 only one course was provided.

CLASS OF 1866.

Name and Residence. *Occupation.* *Course*

BARRICK, DAVID H., Devon, ... General Science.
Farmer.

BOARDMAN, TOWNSEND H., New York, ... General Science.
Dry goods commission business.

BOARDMAN, WILLIAM T., Butte City, Montana, . . General Science.
Mining Superintendent.

BRENEMAN, A. A., New York, ... General Science.
Analytical and Consulting Chemist.

GORDON, CYRUS, Clearfield, ... General Science.
Lawyer.

HAMILTON, HUGH, M. D., Harrisburg, ... General Science.
Physician and Sanitary Expert.

JUDSON, WILLIAM E., Cleveland, Ohio, ... General Science.
Chemist to the Cleveland and Chicago Union Rolling Mill Companies.

PHILLIPS, HOWARD, Baltimore, Md., ... General Science.
Manufacturer.

CLASS OF 1867.

[Owing to changes in the course of study no class was graduated in 1867.]

CLASS OF 1868.

BUCKHOUT, WILLIAM A., State College, ... Agriculture.
Professor of Botany and Horticulture.

CESSNA, DANIEL, Bedford, Pa., ... General Science.
Lumber Dealer.

CLARK, CLARENCE H., Bloomsburg, ... General Science.
Died in 1885.

COMSTOCK, THEODORE B., Tucson, Arizona, ... Agriculture.
Director of the School of Mines, University of Arizona.

CRAM, ROYS J., Detroit, Mich., ... Agriculture.
Contractor.

HIESTER, GABRIEL, Harrisburg, ... Agriculture.
Farmer.

Name and Residence. *Occupation.* *Course.*

HUGHES, HARRY, M. D., Long Branch, N. J., ... General Science.
Physician.

STAVELY, JOSEPH H., Lyndon, Kans., ... General Science.
Lawyer.

TUTTLE, ALBERT H., Charlottesville, Va., ... General Science.
Professor of Biology and Agriculture,
University of Virginia.

CLASS OF 1869.

STACKHOUSE, WM. M., Emilie, ... General Science.
Druggist.

CLASS OF 1870.

CRAM, ARTHUR B., Detroit, Mich., ... General Science.
Architect.

FORMAN, FREDERICK W., Carlisle, ... General Science.
Produce and commission business.

GALBRAITH, WILLIAM W., ... General Science.
First Lieutenant, Fifth Artillery,
United States Army.

CLASS OF 1871.

BURROWS, FRANCIS S., Portland, Me., ... General Science.
United States Engineer Corps.

HAMILTON, JOHN, State College, ... Agriculture.
Farmer.

McCREARY, PITT L., ... General Science.
Died in 1885.

CLASS OF 1872.

[Owing to changes in the college year, no class was graduated in 1872.]

CLASS OF 1873.

Name and Residence. *Occupation.* *Course.*

ALLISON, WILLIAM M., Spring Mills, ... General Science.
Manufacturer and Farmer.

BRUNER, WM. S., M. D., Altoona, ... General Science.
Physician.

EWING, REBECCA H., ... General Science.
Died in 1874.

ISETT, WILLIAM D., Altoona, ... General Science.
Grocer.

MCKEE, CHARLES H., Pittsburgh, ... General Science.
Lawyer.

CLASS OF 1874.

BURKHOLDER, THOMAS W., Midnapore, India, ... Classical.
Missionary.

CAMPBELL, CURTIS G., Johnstown, ... General Science.
Druggist.

CRUMBAUGH, FREDERICK, Chicago, Ill., ... Classical.
Lawyer.

DOWNING, ORRIEN P., San Francisco, Cal., ... General Science.
Chemist and Druggist.

EASLEY, SAMUEL A., Circleville, Texas, ... General Science.
Stock Raiser.

ELLIS, J. ALDER, ... Classical.
Died in 1878.

THOMPSON, WILLIAM H., Lemont, Pa., ... General Science.
Civil Engineer.

CLASS OF 1875.

CALDER, WILLIAM, Harrisburg, ... General Science.
Banker.

GLENN, J. EDWIN, Pittsburgh, ... Classical.
With the P., C. and St. L. R. R. Co.

Name of Residence.	*Occupation.*	*Course.*
SLOAN, JAMES F., Spokane Falls, Washington,	*Real estate dealer.*	General Science.
WALLACE, JOHN J., Elkhorn,	*Grain and lumber dealer.*	General Science.

CLASS OF 1876.

BARROWS, ROSS W., Cameron,	*Lumber dealer.*	General Science.
CALDER, CHARLES M.,	*Died in 1880.*	Classical.
KELLER, B. FRANKLIN, Washington, D. C.,	*Lawyer.*	General Science.
MANLY, WILLIAM M., Diamond Springs, Kan.,	*Farmer.*	Agriculture.
ORVIS, ELLIS L., Bellefonte,	*Lawyer.*	Classical.
STULL, JAMES M., Salt Lake City, Utah,	*Lawyer.*	General Science.
YORK, CHAUNCEY F.,		General Science.

CLASS OF 1877.

CALDER, A. RUSSELL, Harrisburg,	*With Pennsylvania Steel Co.*	Classical.
LANDES, REV. A. GEORGE, Coritiba, Brazil,	*Missionary.*	Classical.
RAY, SYLVESTER D., Bellefonte,	*Lawyer.*	Classical.

CLASS OF 1878.

CHRISTIE, EDWARD H., St. Louis, Mo.,	*Teacher.*	Classical.
KNOCHE, FRANK, Harrisburg,	*Music dealer.*	General Science.

Name and Residence.	*Occupation.*	*Course*
REEVES, CHARLES F., Allentown, N. J.,	*State Agent Commercial Alliance Life Insurance Company.*	General Science.
RUPERT, WILLIAM W., Zion,	*Farmer.*	Classical.
STACKHOUSE, ANNA M., Philadelphia,	*Teacher, Friends' school.*	General Science.
STALLKNECHT, AUGUST C., East Saginaw, Mich.,		General Science.

CLASS OF 1879.

FOSTER, W. K., Mechanicsburg,	*Clergyman.*	Classical.
GREENAWALT, FRANK B., New York,	*General Baggage Agent, C. R. R. of N. J.*	General Science.
HESTON, JOHN W., Seattle, Wash.,	*Principal of High School.*	Classical.
HOUTZ, THOMAS C., Selinsgrove,	*Vice Principal, Missionary Institute.*	Classical.
JOHNSTONBAUGH, GEORGE W., Bellefonte,	*Teacher, High School.*	General Science.
LEITZELL, STUART M., Washington, D. C.,	*Signal Service Department.*	General Science.
SMITH, ALLISON O., Clearfield,	*Lawyer.*	General Science.

CLASS OF 1880.

HAMILL, JAMES L., Graham, Va.,	*Lawyer.*	Classical.
HICKMAN, JOHN F., Columbus, Ohio,	*Agriculturist of Experiment Station.*	Agriculture.
HUNTER, ESTHER E., Stormstown,		General Science.
McCOMBS, J. KELLY, Irvington, Neb.,	*Stock raiser.*	General Science.
REBER, LOUIS E., State College,	*Professor of Mechanical Engineering.*	General Science.
RISHEL, GEORGE P., M. D., Philadelphia,	*Physician.*	Classical.
ROBB, JAMES F., Pittsburgh,	*Lawyer.*	General Science.

CLASS OF 1881.

Name and Residence.	*Occupation.*	*Course.*
CHAMBERS, EDWARD R., Bellefonte,	*Lawyer.*	Classical.
DAVISON, NEVILLE C., Pittsburgh,	*President Keystone Smelting Company.*	Agriculture.
ETTERS, DAVID O., Bellefonte,	*County Superintendent of Public Schools.*	Classical.

CLASS OF 1882.

CANFIELD, ALBERT E., Wyncote,	*Lumber dealer.*	Classical.
CHADMAN, GEORGE S., Conneaut, Ohio.,	*Lawyer.*	General Science.
DALE, EDWARD,	*Died in 1882.*	Classical.
DALE, HORACE C., Rushville, Neb.,	*Banker.*	Classical.
DALE, JOHN M., Bellefonte,	*Lawyer.*	General Science.
McCREARY, IRWIN P., Osceola,	*Supervisor, Tyrone and Clearfield Div. P. R. R.*	General Science.
SAPHORE, EDWIN W., West Winfield, N. Y.,	*Clergyman.*	Classical.
TAIT, ROBERT, Amherst Court House, Va.,	*Stock raiser.*	Agriculture.
WHITE, JAMES G., New York,	*With Edison General Electric Company.*	Classical.

CLASS OF 1883.

BUTZ, GEORGE C., State College,	*Instructor in Horticulture.*	General Science.
CALDER, WILLIAM C., Bhamo, Upper Burma, India,	*Missionary.*	Classical.

Name and Residence.	*Occupation.*	*Course.*
GRAY, WILLIAM E., Bellefonte,	*Lawyer.*	General Science.
HOLLIS, JOSEPH H., Lewistown,		General Science.
LAUGHMAN, IRA J.,	*Died in 1885.*	Classical.

CLASS OF 1884.

ALEXANDER, JAMES W., Bellefonte, — *Lawyer.* — General Science.

HEALEY, JOHN F., Birmingham, Ala., — *Civil Engineer Tenn. C. & S. R. R.* — Civil Engineering.

LOWRY, MILTON W., Scranton. — *Lawyer.* — Classical.

REEVES, JOSEPH W., Huntingdon, — *Electrician, State Reformatory.* — General Science.

CLASS OF 1885.

BARRET, JACOB C., ... General Science.

CHESNEY, CUMMINGS C., Pittsfield, Mass., — *Stanley Laboratory.* — General Science.

JACKSON, CALVIN, Jacksonwald, ... General Science.

JACKSON, DUGALD, C., Madison, Wis., — *Professor of Electrical Engineering.* — General Science.

JACKSON, HELEN, State College, — *Mrs. Louis E. Reber.* — General Science.

NSHIKIAN, PUSANT, F., Kansas City, Mo., — *Chemist.* — General Science.

PATTERSON, EMMA B., Cambridge, Mass., — *Student in Sargent's School for Physical Training.* — General Science.

REBER, OWEN, Annapolis, Ohio, — *Clergyman.* — Classical.

ROTHROCK, HARRY C., Centre Hall, — *Teacher.* — General Science.

CLASS OF 1886.

Name and Residence. *Occupation.* *Course*

DARLINGTON, FREDERICK, New York, ... General Science.
Chief Electrical Engineer, U. S. Illuminating and Power Co.

HOLTER, GEORGE L., ... State College, ... General Science.
Chemist at the College Experiment Station.

MCDONNELL, H. B., M. D., Col. Park, Md., ... General Science.
Professor of Agricultural Chemistry, Md. Ag. College.

PATTERSON, HARRY J., College Park, Md., ... Agriculture.
Chief Chemist of the Experiment Station, Md. Ag. College.

CLASS OF 1887.

FISHER, WILLIAM P., JR., New York, ... General Science.
Lawyer.

STROUSE, WILLIAM F., Baltimore, ... Civil Engineering.
In Charge of Drafting Department, Maryland Construction Co.

WHITE, WILLIAM F., Omaha, Nebraska, ... General Science.
Agent Edison Company.

CLASS OF 1888.

DOWNING, GEORGE M., State College, ... General Science.
Assistant in Physics.

HICKMAN, JAMES C., ... Agriculture.

HUNTER, CAROLINE R., Macon, Ga., ... General Science.
Teacher.

JONES, WILLIAM P., M. D., Minersville, ... General Science.
Physician.

MCKEE, GEORGE C., Seattle, Washington, ... Classical.
Teacher of Physics and Mechanic Arts, High School.

PORTER, WILLIAM M., Denver, Colorado, ... Civil Engineering.
Engineer, Construction Department Denver and Rio Grande Railroad.

CLASS OF 1889.

Name and Residence. *Occupation.* *Course.*

BLAIR, HORACE C., Phila. University Law School, . Latin Science.
Law Student.

FOSTER, JAMES, Goshen Bridge, Va., ... General Science.
Chemist, Virginia Iron and Railway Co.

HAWK, WILLIAM B. N., Johnstown, ... Chemistry.
Chemist, Cambria Iron Company.

HUNTER, JAMES D., Gettysburg, Pa., ... Latin Scientific.
Teacher.

JACKSON, JOHN PRICE, State College, ... Mech. Engineering.
Instructor in Mechanic Arts.

KELLER, U. S. G., Washington, D. C., ... General Science.
Clerk.

MEEK, ELIZABETH B., Bellefonte, ... Natural History.

MILES, HENRY D., Chicago, ... Mech. Engineering.
Assistant District Manager Western
Union Switch and Signal Company.

PATTERSON, ALEXANDER A., Pittsburgh, ... General Science.
Law Student.

ROOP, JACOB G. C., State College, ... Latin Scientific.
Instructor in Preparatory Department.

STRUBLE, JACOB B., Pittsburgh, Swissvale, ... Mech. Engineering.
With Union Switch and Signal Company.

SWANK, ROBERT P., Pottsville, ... Latin Scientific,
Lawyer.

WALDRON, JAMES M., Chattanooga, Tenn., ... Civil Engineering.
Resident engineer, Tenn. and
Chattanooga Railroad.

WELLER, JOHN S., Bedford, ... Civil Engineering.
Lawyer.

CLASS OF 1890.

BALL, ANTIONETTE D., Honesdale, ... General Science.

BEAVER, GILBERT A., Bellefonte, ... Latin Scientific.

BRENEMAN, HERBERT N., Milwaukee, ... Mech. Engineering.
In Shops of Chicago, Milwaukee and
St. Paul Railroad Company.

Name and Residence.	*Occupation.*	*Course.*
BREW, WILLIAM P., Ridgway,	*Draftsman.*	Mech. Engineering.
BROWN, POTTER M., Asheville, N. C.,	*Mining.*	Agriculture.
BRYAN, FRED. A., Chicago, Ill.,	*With Edison General Electric Company.*	Civil Engineering.
DEMMING, GEO. S., Philadelphia,	*Law Student.*	Civil Engineering.
ELENBERGER, I. C. M.,	*Teacher.*	Latin Scientific.
GOSSLER, PHILIP G., New York,	*With United States Illuminating and Power Company.*	Mech. Engineering.
HUNTER, JOHN A., JR., Savannah, Ga.,	*In charge of Department of Mechanic Arts, Bethesda Institute.*	Mech. Engineering.
JACKSON, WILLIAM B., Colorado Springs, Col.,	*In banking business.*	Mech. Engineering.
JONES, MARGARET B., State College,	*Mrs. J. Price Jackson.*	Latin Scientific.
LEYDEN, HARRY R., Chicago, Ill.,	*With Edison General Electric Co.*	Mech. Engineering.
MCLEAN, HARRY B., Pittsfield, Mass.,	*Designer, Stanley Laboratory.*	Mech. Engineering.
MEEK, GEORGE R., Bellefonte,	*Assistant Editor of the Bellefonte "Watchman."*	Latin Scientific.
MITCHELL, HOWARD W., Pittsburgh,	*Law Student.*	Latin Scientific.
MOCK, JAMES C., Pittsburgh,	*With Union Switch and Signal Co.*	Mech. Engineering.
WALKER, JAMES B., Option,	*Farmer.*	General Science.
WALKER, J. M., Williamsport,	*Law Student.*	General Science.
WALKER, WILLIAM H.,	*Student in Chemistry, Göttingen, Germany.*	Chemistry.

CLASS OF 1891.

BARTLEY, WILLIAM A., Nashville, Tenn.,	*Instructor in Mechanic Arts, Fisk University.*	Mech. Engineering.
MCKEE, ARTHUR G., Chicago, Ill.,	*With Edison General Electric Co.*	Mech. Engineering.

Name and Residence. *Occupation.* *Course.*

CAMP, WALTER M., San Francisco, Cal., . . Civil Engineering.
Drafting Department,
Southern Pacific R. R. Co.

FIELDS, JOHN W., State College, ... Chemistry.
Ass't Chemist, Experiment Station.

GILKEY, THOMAS A., New Castle, ... Civil Engineering.
Civil Engineer.

GREEN, CHARLES M., Pittsburgh, ... Physics and Electrotechnics.
Electrician.

GRIFFIN, FRANCIS A., Pittsburgh, ... Mech. Engineering.
With Keystone Bridge Co.

HAMILTON HUGH, JR., New York, ... Physics and Electrotechnics.
C. & C. Motor Co.

LONG, HARRY D., Chicago, Ill., ... Physics and Electrotechnics.
With Edison General Electric Co.

MOORE, MAUD, Lemont, ... Latin Scientific.
Teacher.

SULOFF, NOAH H., Patterson, ... Civil Engineering.
TAYLOR, DILWORTH M., Media, ... Civil Engineering.
WEIDNER, FRALEY N., Chester, ... Chemistry

THE PREPARATORY DEPARTMENT.

This Department is intended to furnish instruction to persons well trained in the Elementary Common School branches, and yet not fully prepared for admission to the Freshman Class. It does not, however, offer instruction in the Primary branches, nor is it in any sense a High School. The studies are arranged chiefly with reference to their importance in preparing students for one of the regular College Courses.

Special care is taken to make the instruction systematic and thorough in order that the foundation for future progress may be securely laid.

Students in this Department, except those who are under the immediate care of their parents or guardians, are required to room in that part of the College dormitories assigned to the Department. Here they are under the personal supervision of the Principal of the Department and his Assistants.

They are required, in addition to the regulations governing College students, to observe certain fixed study hours, during which they must neither pay nor receive visits. Every effort is made to train them to habits of close attention and to correct methods of study. At other times than in recitation and study hours they have ample opportunity for healthful sports and recreation, either on the extensive and beautiful grounds, or, in stormy weather, in the new Gymnasium. They also, if of sufficient age, take part in the regular military drill.

ADMISSION.

FIRST YEAR.—All applicants for admission must be at least fourteen years of age, and be prepared, at the beginning of the Autumn session, to pass a satisfactory examination in the following branches:

Arithmetic—Thompson's Complete (or its equivalent) to Ratio; English Grammar, Wells' (or its equivalent) to page 102, which includes Etymology.

In Geography, Spelling, Reading and Penmanship, the examination must show such a degree of proficiency as not to require further instruction in those branches.

SECOND YEAR.—Those who apply for admission to the Autumn session of the *Second Year* must be prepared to pass, in addition to the above, an examination on all the work of the *First Year*.

All persons entering classes after the opening of the first session will be required to pass an examination in the work already gone over by the class into which they seek admittance.

TUITION in this Department is free; room-rent and other charges are the same as in the College proper.

EXAMINATION FOR ADMISSION, Tuesday, September 13, 1892, at 9 o'clock a. m.

SCHEDULE OF PREPARATORY STUDIES.

[Figures after subjects indicate hour of recitation or practice per week; *italics*, titles of text books.]

GENERAL SCIENCE COURSE.

FIRST YEAR.

FALL SESSION.—*Thompson's Arithmetic*, completed from ratio (4), *Martin's Human Body* (4), *Scudder's United States History*, to Part III (3), *Murray's Advanced Lessons in Analysis*, to Part III (5).
Practicum.—Freehand Drawing (4).

WINTER SESSION.—*Wentworth's School Algebra*, to page 120 (5), *Scudder's History*, completed (5), *Murray's Analysis*, completed (5).
Practicum.—Object Drawing (5).

SPRING SESSION.—*Wentworth's School Algebra*, continued to page 200 (5), *Lancaster's History of England* (5), *Chittenden's English Composition* (5).
Practicums.—Bookkeeping (4), Elementary Design (4).

SECOND YEAR.

FALL SESSION.—*Wentworth's School Algebra*, continued to page 292 (5), *Gage's Elements of Physics*, to chapter V (5), *Eclectic Physical Geography* (5).
Practicum.—Object Drawing (5).

WINTER SESSION.—*Newcomb's College Algebra*, from page 85 to page 200 (5), *Gage's Elements of Physics*, completed (3), *Wentworth's Revised Plane Geometry*, Books I and II (5), English Classics (3). [List for 1892–3: Scott's Ivanhoe, Coleridge's Ancient Mariner, Longfellow's Evangeline, and Courtship of Miles Standish, Irving's Sketch Book, Shakespeare's Julius Cæsar, and Richard III.]
Practicum.—Applied Design (5).

SPRING SESSION.—*Newcomb's College Algebra*, continued to page 220, and Applied Arithmetic (5), *Wentworth's Plane Geometry*, completed (5), *Thorpe's Civil Government* with English essays (5).
Practicum.—Color and Design (5).

LATIN–SCIENTIFIC COURSE.

FIRST YEAR.

FALL SESSION.—*Thompson's Arithmetic*, completed from Ratio (4), *Martin's Human Body* (4), *Scudder's United States History*, to Part III (3), *Comstock's First Latin Book*, forty lessons (5).
Practicum.—Freehand Drawing (4).
WINTER SESSION.—*Wentworth's School Algebra*, to page 120 (5), *Scudder's History*, completed (5), *Comstock's Latin Lessons*, completed (5).
Practicum.—Object Drawing (5).
SPRING SESSION.—*Wentworth's School Algebra*, continued to page 200 (5), *Chittenden's English Composition* (5), *Greenough's Cæsar*, Books I and II (5).
Practicums.—Bookkeeping (4), Elementary Design (3).

SECOND YEAR.

FALL SESSION.—*Wentworth's School Algebra*, continued to page 292 (5), *Gage's Elements of Physics*, to chapter V (5), *Greenough's Cæsar*, Books III and IV with 13 lessons in *Allen's Prose Composition* (5).
Practicum.—Object Drawing (5).
WINTER SESSION.—*Newcomb's College Algebra*, from page 85 to page 200 (5), *Gage's Elements of Physics*, completed (3). *Wentworth's Plane Geometry*, Books I and II (5), *Chase and Stuart's Cicero*, Two orations against Catiline with Prose Composition (3).
Practicum.—Applied Design (5).
SPRING SESSION.—*Newcomb's College Algebra*, continued to page 220, and Applied Arithmetic (5), *Wentworth's Plane Geometry*, completed (5), *Chase and Stuart's Cicero*, Third oration against Catiline and *Pro Archia* (5).
Practicum.—Color and Design (5).

Rhetorical exercises, consisting of essays, declamations, reproductions and readings, one hour per week throughout each course.

[For list of students in the Preparatory Department see pages 69–71.]

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CALENDAR FOR 1891–92.

1891—Sept. 9, *Wednesday*, ... Fall Session began.
1891—Dec. 18, *Friday*, ... Fall Session ended.

DECEMBER 18 TO JANUARY 6—VACATION.

1892—January 6, *Thursday*, ... Winter Session begins.
1892—March 30, *Wednesday*, ... Winter Session ends.

MARCH 30 TO APRIL 6—VACATION.

1892—April 6, *Wednesday*, ... Spring Session begins.
1892—June 26 to 30, ... COMMENCEMENT WEEK.

June 26, *Sunday*, ... Baccalaureate Sermon.
June 27, *Monday*, ... Anniversary of Y. M. C. A.
June 28, *Tuesday*, ... EXAMINATIONS FOR ADMISSION: Junior Oratorical Contest.
* June 29, *Wednesday*, ... Annual meeting of Delegates to elect Trustees; Annual meeting of Trustees; Annual meeting of Alumni; Alumni Address.
July 30, *Thursday*, ... GRADUATION DAY.

JUNE 30 TO SEPTEMBER 14—VACATION.

1892—September 13, *Tuesday*, ... EXAMINATIONS FOR ADMISSION.
1892—September 14, *Wednesday*, . . . Fall Session begins.
1892—November 24, *Thursday*, . . . Thanksgiving Day.
1892—December 23, *Friday*, ... Fall Session ends.

DECEMBER 23 TO JANUARY 4—VACATION.

1893—January 4, *Wednesday*, ... Winter Session begins.
1895—April 5, *Wednesday*, ... Spring Session begins.
1893—June — to —, ... Commencement Week.

* The above calendar for Commencement week, 1892, is likely to be changed.

Means of Access.

The College is now easily accessible from every part of the State.

1. A railroad from Montandon, on the Philadelphia and Erie road, to Bellefonte, and thence to Tyrone, on the Pennsylvania Central, passes within about two and a half miles of the College, at Lemont. At Lemont a regular conveyance for the College meets each train. At the beginning and close of each term free conveyance for specified trains is provided between Lemont and the College, for all students.

2. Passengers from the northern, north-eastern and eastern parts of the State can most conveniently reach Lemont by way of Montandon; those from the north-western parts, by way of Lock Haven and Bellefonte; and those from the western and southern parts, by way of Tyrone and Bellefonte. The last named route can also be taken by those coming from the east.

3. A new railroad from Bellefonte runs within one mile of the College, and is expected soon to be completed directly to the village of State College and to Beech Creek, on the Philadelphia and Reading railroad.

The College has direct connection with Bellefonte and Lemont by Telephone.

Hotel accommodations for parents and others visiting friends can be had near the College.

The nearest railroad, telegraph and express station is "Lemont."

The post-office direction of students and other persons connected with the College is,

"STATE COLLEGE, PA."

3 0112 105894957